

STUDIES IN THE THEACEAE, XII
NOTES ON THE SOUTH AMERICAN SPECIES OF
TERNSTROEMIA

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SINCE the type species, *Ternstroemia meridionalis* Mutis ex Linnaeus f., was first described in 1781, well over a hundred entities from tropical America have been accredited to this genus. Two regional studies have been published on these American species. In 1866 Wawra discussed the Brazilian and closely related species in Martius, *Flora Brasiliensis*, and in 1896 Urban, in *Botanische Jahrbücher*, offered his excellent treatment of the West Indian species.

At the suggestion of some of my colleagues, I borrowed from several of the leading American herbaria all the available material (American) of *Ternstroemia* in the hope of preparing a monographic treatment of this genus. Although knowing full well that many of the types were deposited in European herbaria and that these specimens would not be available for this work, I had hoped that I might find sufficient authentic representative material in America to offset this lack of European types. I soon discovered my error. When the very early species were described, the authors were exceedingly brief in their descriptions, stressing only the most obvious characters, not realizing that these obvious characters such as "leaves coriaceous, obovate-elliptic, tapering at the base into a petiole" would fit nearly every species already described and those to be described later. Fortunately, in the material borrowed from the Field Museum of Natural History (FM) were photographs of many of the missing types. Although the "concealed" characters such as petals, stamens, ovary, style and stigma could not be discerned, without these photographs the present study would have been impossible. To the far-seeing individuals who prepared these photographs, I am very grateful. Aiding equally were the type and otherwise authentic material from the Gray Herbarium (G), the herbaria of the New York Botanical Garden (NY), Missouri Botanical Garden (Mo), and the United States National Museum (US). To these institutions also I am much indebted. Although this brief study may not take on the noble title of monograph, I hope that the amplified descriptions with notes on specific relationships, the citations of literature and specimens and the synonymy may prove of assistance to workers in the various regions of South America. A second paper will be published in the near future dealing with the North American species of the genus.

The genus *Ternstroemia* was first proposed by Mutis in Linnaeus f., *Supplementum Plantarum*, 39. 1781. Various other names have been applied to this genus, such as *Taonabo* Aublet (1775), *Dupinia* Scoparius (1777), *Hoferia* Scoparius (1777), *Tonabea* Jussieu (1789), *Amphania*

Banks (1821), *Reinwardtia* Korthals (1840), *Llanosia* Blanco (1845), *Erytrochiton* Schlechter (1846), *Voelckeria* (1847) and *Mokofua* Kuntze (1891). *Taonabo* is the *nomen prius* of this group of synonyms and until a few years ago was used by several of the American botanists who followed the rule of strict priority laid down by the American Code of Nomenclature. However, the name *Ternstroemia* has been adopted by the members of the Congress of the International Code of Nomenclature as one of the "nomina conservanda" and the name *Taonabo* listed as "nomina rejicienda" thus ending any controversy which might have existed over the correct name.

Ternstroemia Mutis ex Linnaeus f.

Flowers hermaphroditic; sepals 5, rarely 6, imbricate, persistent. Petals 5, rarely 6, free to base, connate to middle or above the middle, very rarely to the apex, approaching cleistogamy, when free more or less imbricate. Stamens 25–300, 2- rarely few- or 1-seriate; filaments connate, the outer filaments adnate to the base of the petals; anthers usually longer than the filaments, rarely shorter, oblong or linear, the connective usually projected into an apiculate or caudate appendage, rarely muticous. Ovary 2-, 3-, rarely 1-loculate or, with accessory septa, 4–6-loculate, the ovules in each locule 2–20, rarely solitary, pendulous from the apex of the placenta on a more or less evolute funiculus. Style 1, entire or rarely deeply 2–3-parted; stigma or stigmata minutely punctiform or evolute, entire or lobate. Fruit indehiscent, rarely dehiscent at the apex into valves or by a circumscissile layer near the base. Seeds few; testa opaque, smooth, rarely plicate-rugulose, yellow, often covered with brown, many-celled papilli.

Glabrous trees or shrubs with the branches often subopposite or verticillate. Leaves spirally disposed, congested or verticillate at the apex of the current year's growth, usually coriaceous, rarely chartaceous or membranaceous, entire, subentire or rarely truly dentate. Flowers axillary, solitary, bracteolate, the bracteoles 2, rarely 4, opposite or subopposite, placed immediately beneath calyx, rarely with one somewhat removed on pedicel.

TYPE SPECIES: *Ternstroemia meridionalis* Mutis ex Linnaeus f.

KEY TO THE SOUTH AMERICAN SPECIES

- A. Fruit a dehiscent capsule.
 - B. Fruit with circumscissile dehiscence at the base (Bolivia) . . . 1. *T. circumscissilis*.
 - BB. Fruit dehiscing at the apex into four valves (Brazil) 2. *T. dehiscens*.
- AA. Fruit an indehiscent capsule.
 - B. Ovary 4-loculate, loculi 1-seeded. (See also under BBBB).
 - C. Leaves distinctly dentate, dark-punctate on lower surface. . . 34. *T. dentata*.
 - CC. Leaves entire (or finely serrulate), not punctate on lower surface.
 - D. Stigma punctiform.
 - E. Pedicels short, 0.5–0.7 cm. long; leaves obtusely acuminate at the apex, subrotund at the base; petiole 5 mm. long (Brazil) 3. *T. borbensis*.
 - EE. Pedicels 1.5–3.0 cm. long; leaves obtuse but not acuminate at the apex, subrotund at the base; petiole 10 mm. long. . . 36. *T. laevigata*.
 - DD. Stigma peltate, sometimes 4-crenate.
 - E. Style minute, 1 mm. or less long. 10. *T. brevistyla*.
 - EE. Style 4 mm. long in flower, 7 mm. long in fruit. . . 29. *T. oligostemon*.
 - BB. Ovary 1-loculate.
 - C. Leaves 18–21 cm. long, 7–8 cm. wide (British Guiana) . . . 4. *T. Gleasoniana*.
 - CC. Leaves 3–5 cm. long, 1.2–2.5 cm. wide (Venezuela) 5. *T. discoidea*.

- BBB. Ovary 3-loculate.
- C. Style 3-parted (British Guiana, Dutch Guiana, Venezuela, Brazil)6. *T. punctata*.
- CC. Style entire.
- D. Sepals and bracteoles entire and scarious-margined, not glandular-denticulate.
- E. Pedicels short, 4-7 mm. long, 2-3 mm. thick; petals 10-11 mm. long, 6-8 mm. wide24. *T. camelliaefolia*.
- EE. Pedicels 10-25 mm. long, slender, graceful; petals 5-6 mm. long, 2-4 mm. wide.
- F. Leaves membranaceous, veins conspicuous; stigma subcapitate, tri-crenate (French Guiana, Trinidad)7. *T. delicatula*.
- FF. Leaves coriaceous, veins obscure; stigma punctiform (British Guiana)8. *T. Browniana*.
- DD. Sepals and bracteoles glandular-denticulate on the margin.
- E. Stigma subcapitate, crenate, usually 3-crenate.
- F. Style minute, hardly equalling the ovary in length, or shorter.
- G. Leaves 10-12 cm. long, 4-5 cm. wide, nigro-punctate beneath, the veins (ca. 7 pairs) evident; pedicels 1.5-2.0 cm. long (Brazil)9. *T. alnifolia*.
- GG. Leaves 3-5 cm. long, 2-3 cm. wide, not punctate below, the veins not evident; pedicels 6-8 mm. long (Venezuela)10. *T. brevistyla*.
- FF. Style longer than the ovary (3-4 mm. +).
- G. Fruit large, up to 2.5 cm. long and 2 cm. diameter; pedicels 2.5-4.5 cm. long, 4-5 mm. diameter; leaves oblong-obovate, up to 16 cm. long23. *T. macrocarpa*.
- GG. Fruit not over 1.2 cm. long and the same diameter; pedicels ca. 1 cm. long; leaves cuneate, up to 6 cm. long46. *T. cuneifolia*.
- EE. Stigma punctiform.
- F. Leaves acuminate at apex; connective of stamens prolonged into a caudate appendage 1-2 mm. long; petals connate at base for one-half or more their entire length.
- G. Pedicels up to 4 cm. long; bracteoles 5-8 mm. long.
- H. Leaves 12-16 cm. long with 20-30 pairs of veins; pedicels very slender, pendulous from base (Peru)11. *T. penduliflora*.
- HH. Leaves 7-10 cm. long with 7-8 pairs of veins; pedicels sturdy, erect (Brazil)12. *T. Candolleana*.
- GG. Pedicels 1.0-1.5 cm. long; bracteoles 0.7-1.4 mm. long (Brazil)13. *T. subcaudata*.
- FF. Leaves obtuse at apex; petals connate at base but less than one-half the entire length; connective of stamen prolonged into a short apicule.
- G. Petiole 6-7 mm. long; pedicels 7-8 mm. long; leaves obovate, up to 7 cm. long and 3 cm. wide (British Guiana)14. *T. Schomburgkiana*.
- GG. Petiole 10-15 mm. long; pedicel up to 25 mm. long; leaves oblong-obovate to lanceolate, 6-13 cm. long, 2.0-4.5 cm. wide (Brazil)15. *T. brasiliensis*.
- BBBB. Ovary 2-loculate.
- C. Corolla calyptrate, cleistogamous or nearly so, the corolla-walls thickened.
- D. Corolla opening by minute pore at apex, the lobes minute (ca. 1 mm. long and wide), the walls 1 mm. thick (Peru)16. *T. globiflora*.

- DD. Although petal outlines distinguishable, apparently cleistogamous, a thickened band (1 mm. deep) at base (Colombia) . . . 17. *T. congestiflora*.
- CC. Petals free, at least to near the middle, membranaceous.
- D. Style 2-parted.
- E. Leaves small, not over 7 cm. long and 1.5 cm. wide.
- F. Leaves elliptic-lanceolate, 4.5–6.5 cm. long, 1.0–1.5 cm. wide, the petiole 5–7 mm. long; sepals small, semi-orbicular, 3–5 mm. long, ca. 4 mm. wide (Venezuela) 18. *T. distyla*.
- FF. Leaves cuneate, 2.5–3.0 cm. long, 1.0–1.3 cm. wide, sessile; sepals long-attenuate, sharp-pointed, 13–15 mm. long, ca. 5 mm. wide at base (Venezuela) 19. *T. tristyla*.
- EE. Leaves very large, 13–19 cm. long, 5–8 cm. wide (British Guiana) 20. *T. grandiosa*.
- DD. Style entire.
- E. Outer calyx-lobes entire, scarious-margined, not glandular-denticulate; bracteoles may or may not be glandular-denticulate, if so, sparsely.
- F. Fruit unusually large, 2–4 cm. long, 2–4 cm. wide.
- G. Fruit 1–2-seeded; seeds ca. 3 cm. long, 1.5 cm. diameter, covered with a reddish brown crusty surface when dry (Brazil) 21. *T. Krukoffiana*.
- GG. Fruit 5–18-seeded, seeds not over 1 cm. long, surface smooth.
- H. Pedicel 25–45 mm. long, 4–5 mm. diameter at apex; calyx-lobes 9–13 mm. long, 10–15 mm. wide.
- I. Pericarp very thick, 4–6 mm. wide, porous or spongy; septa in fruit indistinguishable; bracteoles suborbicular, immediately below calyx (Peru) . . . 22. *T. pachytrocha*.
- II. Pericarp shell-like; septa in fruit clearly defined; bracteoles triangular, 5–7 mm. below calyx on pedicel (Colombia) 23. *T. macrocarpa*.
- HH. Pedicels short, 4–7 mm. long, 2–3 mm. diameter; calyx-lobes 5–8 mm. long, 7–8 mm. wide (Venezuela) 24. *T. camelliaefolia*.
- FF. Fruit normal-sized (ca. 1.5 cm. or less long and as wide).
- G. Leaves linear-oblongate, 3–5 cm. long, 0.4–0.6 cm. wide; stigma punctiform; stamens with caudate appendages 1 mm. or more long (Venezuela) 25. *T. duidae*.
- GG. Leaves oblong-obovate to elliptic, never less than 1 cm. wide; stigma peltate or bi-crenate; stamens with mucous or slightly apiculate appendages.
- H. Flowers large, ca. 2 cm. or more across; petals up to 12 mm. long, united for 3–4 mm. at base into a tube; stamens 125–200.
- I. Pedicels 15–17 mm. long, sturdy; leaves 8–10 cm. long, 3.5–4.5 cm. wide, with stout petiole 5–10 mm. long (Ecuador) 26. *T. Lehmannii*.
- II. Pedicels 5–10 mm. long, compressed; leaves small, 2–4 cm. long, 1.5–2.0 cm. wide, with short petiole 3–5 mm. long or shorter (Colombia) . . . 27. *T. meridionalis*.
- HH. Flowers less than 1 cm. across; petals not over 5–7 mm. long, not united into a conspicuous tube.

- I. Leaves oblong-obovate to elliptic, the margin entire or subentire, the apex not generally retuse.
- J. Petiole very short, ca. 3 mm. long; filaments crassate (Peru).....28. *T. Jelskii*.
- JJ. Petioles longer, 8-14 mm. long; filaments filiform (Trinidad).....29. *T. oligostemon*.
- II. Leaves cuneate, the margin distinctly crenate, the apex consistently retuse (Venezuela).....30. *T. retusifolia*.
- EE. Outer calyx-lobes and bracteoles distinctly glandular-denticulate.
- F. Style 2-parted for approximately half its length (Venezuela).....
.....31. *T. pungens*.
- FF. Style entire.
- G. Stigma punctiform.
- H. Style unusually long, up to 10 mm.
- I. Leaves completely revolute to midrib, subsessile, the petiole 1-2 mm. long (Venezuela).....32. *T. dura*.
- II. Leaves flat, revolute only at margin, the petiole ca. 5 mm. long (Brazil).....33. *T. oleaefolia*.
- HH. Style seldom over 5-6 mm. long.
- I. Leaves distinctly dentate; connective of anthers projected for 2 mm. or more into a distinct caudate appendage (Brazil, French Guiana)....34. *T. dentata*.
- II. Leaves entire or crenulate, never dentate; connective never projected into an appendage measuring more than 1 mm. in length.
- J. Branchlets angled; leaves membranaceous, 2.5-3.0 cm. long, 1.0-1.5 cm. wide; veins (4-5 pairs) reticulate below (Peru).....35. *T. brachypoda*.
- JJ. Branchlets terete; leaves coriaceous, up to 6 cm. or over (4 cm. in *T. verticillata*); veins, if evident, not reticulate.
- K. Stamens equalling the corolla in length; petals connivent at apex, crisp (British Guiana).....
.....36. *T. laevigata*.
- KK. Stamens included within the corolla; petals obtuse or spreading at apex, not connivent.
- L. Stamens numbering over 300, the connective plane or muticous at the apex of the anther, not projected into an apicule (Bolivia).....
.....37. *T. polyandra*.
- LL. Stamens numbering 100 or less, the connective projected at the apex of the anther into an apiculate appendage.
- M. Petals joined for two-thirds or more from the base into a "tube."
- N. Leaves obovate to cuneate-oblong, 2-4 cm. × 1-2 cm., truncate or retuse at apex, with petiole up to 5 mm. long (British Guiana)....38. *T. verticillata*.
- NN. Leaves oblong-obovate, 6-8 cm. × 2.5-3.5 cm., abruptly acuminate at

- apex, with petiole ca. 10 mm. long (Peru).....39. *T. Klugiana*.
- MM. Petals joined only at the base, not forming a "tube."
- N. Bracteoles ovate, ca. 4 mm. long; filaments compressed, very short, less than 1 mm. long (Brazil) ...40. *T. carnosa*.
- NN. Bracteoles minute, 1-2 mm. long; filaments filiform, 1.5-3.0 mm. long.
- O. Leaves often asymmetrical, epunctate below; calyx-lobes 4-5 mm. long, 4-5 mm. wide; connective hardly muticous (Bolivia)41. *T. asymmetrica*.
- OO. Leaves symmetrical, dark-punctate below; calyx-lobes 7-10 mm. long, 5-7 mm. wide; connective subacuminate (Colombia)42. *T. clusiaefolia*.
- GG. Stigma peltate, subcapitate or crenulate.
- H. Pedicels 4-6 cm. long.
- I. Leaves elliptic, acute at both ends, submembranaceous; calyx-lobes orbicular, ca. 5 mm. long (British Guiana)43. *T. longipes*.
- II. Leaves obovate, obtuse or rounded at apex, coriaceous; calyx-lobes small, 2.5-3.5 mm. long, ca. 2.5 mm. wide (British Guiana).....44. *T. crassifolia*.
- HH. Pedicels up to 2.5 cm. long.
- I. Leaves seldom over 2.5 cm. long; pedicels 2.5 cm. long, equalling the leaves in length (Peru).....45. *T. quinquepartita*.
- II. Leaves up to 6-10 cm. long; pedicels much shorter in comparison.
- J. Leaves cuneate, obtuse and retuse at apex (Brazil)46. *T. cuneifolia*.
- JJ. Leaves oblong-elliptic, obovate or oblanceolate, not cuneate; acuminate at apex.
- K. Leaves sharply serrate or subserrate with conspicuous veins (10 pairs) and reticulations below; bracteoles rounded (Bolivia).....47. *T. subserrata*.
- KK. Leaves entire or subentire with veins not evident; bracteoles triangular.
- L. Pedicels very short, 5-8 mm. long; calyx-lobes minute, 2-3 mm. long, 1.5-2.0 mm. wide; petals most minute, shorter than the calyx-lobes; style very short, 0.8 mm. long (Colombia).....48. *T. Killipiana*.
- LL. Pedicels slender, 15-25 mm. long; calyx-lobes 6-8 mm. long, 4-5 mm. wide; petals 8-9 mm. long; style 1.5 mm. long (Colombia).....49. *T. Mutisiana*.

1. *Ternstroemia circumscissilis*, sp. nov.

Arbor 15 metralis, ramulis griseis teretibus. Folia oblongo-obovata, 10–15 cm. longa et 4–7 cm. lata, coriacea, apice obtuse acuminata vel rotundata, basi cuneata, undique nitida et granuloso-punctata, margine revoluta, integerrima vel subcrenulata, costa supra canaliculata, subtus elevata, nervis (ca. 10 paribus) subinconspicuis, petiolis 1.5–2.0 cm. longis. Flores solitarii, pedicellis 1.5–2.0 cm. longis, gracilibus, bracteolis 2, oppositis late ovato-triangularibus inaequalibus 4×4 mm. et 2.5×2.5 mm. glanduloso-denticulatis; sepala 5, imbricata, suborbicularia, pergamentacea, subaequalia, 5.5–7.0 mm. longa et circa 6 mm. lata, margine subscariosa vel scariosa, non glanduloso-denticulata; petala 5 vel 6, membranacea, (5–)7–8 mm. longa et 5.0–5.5 mm. lata, apice rotundata, basi 3 mm. connata; stamina bi-seriata, circa 70, circa 4 mm. longa, filamentis 2 mm. longis gracilibus, basi connatis et ad corollam adnatis, antheris linearibus ca. 2 mm. longis, connectivo subacuminato; ovarium conicum, 2 mm. longum, 2(3–?)-loculare, loculis pauci-ovulatis, stylo circa 2 mm. longo, stigmatate peltato 1 mm. vel plus diametro. Fructus conicus pentagonus, 1–2 cm. longus, basi 1–2 cm. diametro, 2–3-loculatus, seminibus 4 in loculis 2, epicarpio (ut videtur) indurato ad 5 mm. crasso, basi optime circumscissili; seminibus complanatis, ca. 7 mm. longis.

DISTRIBUTION: Bolivia.

BOLIVIA: Dept. La Paz, Prov. Larecaja, Copacabana (about 10 km. south of Mapiri), alt. 850–950 m., *B. A. Krukoff 11065* (TYPE, AA; ISOTYPE, NY), Oct.–Nov. 1939 (tree 50 ft. high). — Mapiri, alt. 1500 m., *H. H. Rusby 486* (FM, G, Mo, NY, US), April 1886. — Mapiri Region, San Carlos, on way to San José, alt. 800 m., *O. Buchtien 895* (NY, US), Apr. 12, 1927. — Mapiri Region, San Carlos, alt. 750 m., *O. Buchtien 2082*, Sept. 1907.

The circumscissile dehiscence at the extreme base of the fruit is the outstanding character of this species. At dehiscence the fruit separates by a distinct cleavage line into a conical pentagonal cap (comprising most of the fruit) and the flat base. On the inside of the base, after separation, can be found the locular depressions showing the number of cells, which may vary from 2 to 3 on a single herbarium specimen. In the flowers examined only 2-celled ovaries were found. However, only a very few floral dissections were made because of the paucity of flowering material. The persistent calyx increases in size until in fruit it measures as much as 2 cm. across. In this respect it resembles some of the Polynesian species.

2. *Ternstroemia dehiscens* Huber in Bull. Soc. Bot. Genève, sér. 2, 6: 189, 1915.

DISTRIBUTION: Brazil.

BRAZIL: State of Pará, in field near Ariramba river, *A. Ducke 8032* (photo and fragment of TYPE, FM), Dec. 21, 1906.

Low shrub with gray branchlets. Leaves subcoriaceous, obovate, 5–7 cm. long, 2.0–3.5 cm. wide, obtuse at apex, often long acuminate, narrowed at base into a slender petiole 1 cm. long, the margin entire or obscurely denticulate, shining above, opaque below, the veins indistinct. Flowers axillary, solitary, with pedicels 1 cm. long; bracteoles semi-orbicular, ovate, minutely apiculate; sepals subequal, 4 mm. long, orbicular, with the inner lobes narrower, the outer lobes hardly glandular-denticulate; petals with subentire margins; stamens caudate; ovary 4-celled, the style equal to the ovary in length; the stigma minute [probably punctiform]. Fruit yellow,

ovoid-globose, 13 mm. long, 11 mm. diam., abruptly contracted into a style 5 mm. long, dehiscing into 4 pergamentaceous valves with involute margins, a central tetragonal columella persisting. Seeds cuneate-oblong, 7 mm. long, reddish.

Only a photograph and fragment of the type of this species were available for study. The outstanding character is the dehiscent capsule. The author remarks that when the style drops off, the capsule splits "subregulariter" into four pergamentaceous valves with involute margins. A central tetragonal columella persists. The photograph of the type shows a single capsule with four spread valves. Not having actually seen this specimen or one like it, I must refrain from making critical comments concerning this startling character.

3. **Ternstroemia borbensis**, sp. nov.

Frutex parvus, ramulis teretibus argenteis. Folia coriacea, elliptica vel obovata (marginibus imparibus), 5.0–8.5 cm. longa, 2–4 cm. lata, apice obtusa vel obtuse acuminata, basi subrotundata, margine serrata, plana, saepe ad basim subrevoluta, supra nitida, subtus opaca, costa supra canaliculata, subtus elevata, venis obscuris, petiolis 5 mm. longis. Flores solitarii, rosei, apice ramulorum positi, pedicellis 5–7 mm. longis recurvis, bracteolis 2 oppositis triangulari-ovatis circiter 1 mm. longis et basi 1 mm. diametro glanduloso-denticulatis; sepala 5, imbricata, inaequalia, pergamentacea, exterioribus lato-ovatis brevibus 4–5 mm. longis et 2.2–3 mm. latis, sparse glanduloso-denticulatis, interioribus obovatis circiter 5 mm. longis et 4.0–4.5 mm. latis; petala 5, ovata, 4.5–5.0 mm. longa, basi 2.5–3.0 mm. connata; stamina circiter 30, bi-seriata, inaequalia, antheris circiter 1.5 mm. longis, interiorum filamentis gracilibus circiter 1 mm. longis, exteriorum crassis 0.5 mm. vel minus longis, connectivo circiter 1 mm. projecto; ovarium conicum, circiter 1.5 mm. longum et 2 mm. basi diametro, 4-loculatum, loculis 1-ovulatis, stylo 3 mm. longo, stigmate punctiformi. Fructus ignotus.

DISTRIBUTION: Brazil.

BRAZIL: State of Amazonas, Borba (Rio Madeira), among low growth in sandy field, *A. Ducke* 468 (AA, TYPE; FM, Mo, NY, US), April 22, 1937 (small shrub with pink flowers).

The leaves of *T. borbensis* are generally elliptic, subrotund at the base, with the margins serrate and very irregular. The pedicels are short (5–7 mm. long) and recurved and the bracteoles are minute, triangular and glandular-denticulate. In all the flowers examined, the ovary proved to be four-celled, each cell 1-ovulate and the stigma punctiform. In the stamens the connective is projected into a long (1 mm.) caudate appendage.

4. **Ternstroemia Gleasoniana**, sp. nov.

Frutex 3.0–4.5 m. altus, ramulis crassis teretibus griseis. Folia crassocoriacea, oblongo-elliptica vel oblongo-obovata, 18–21 cm. longa et 7–8 cm. lata, apice obtusa vel subrotundata, abrupte acuminata, basi obtuse cuneata, subtus non punctata, margine subintegerrima, pauce glanduloso-denticulata, subrevoluta, costa supra profunde canaliculata, subtus elevata, venis 18–20 paribus, supra obscuris, subtus conspicuis, petiolis crassis 2.0–2.5 cm. longis. Flores apice ramulorum congesti; pedicelli crassi, 6–8 mm. longi, bracteis glanduloso-denticulatis basi depositis; bracteolis 2 inaequalibus late ovatis vel suborbicularibus, 3 mm. longis et 2.7–4.0 mm. latis, margine glanduloso-

denticulatis; sepala 5, imbricata, crassa, exterioribus 5–7 mm. longis et 5–6 mm. latis, margine sparse glanduloso-denticulatis, interioribus ovatis 6–8 mm. longis et 5.0–5.5 mm. latis, margine integerrimis scariosis; petala 5, ovata, longo-acuminata, 5.0–5.5 mm. longa, basi ad 3 mm. connata; stamina ca. 25, uni-seriata, 3–4 mm. longa, filamentis crassis 1.0–1.5 mm. longis, antheris subsagittatis ca. 2 mm. longis, connectivo 0.25 mm. projecto; ovarium subconicum ca. 1.5 mm. longum, 1-loculatum (ut videtur), pauci-ovulatum, stylo integerrimo, 4 mm. longo, stigmatate punctiformi. Fructus ignotus.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Potaro Landing, in clearing and along roadsides, *H. A. Gleason* 258 (TYPE G; NY), June–July 1921 (shrub 12–15 ft. high).

This species is delimited by the following outstanding characters: (1) shrub 3–4 m. high; (2) leaves unusually large (18–21 × 7–8 cm.), thick-coriaceous, under surface smooth (not punctate); (3) flowers congested at apex of branchlets; (4) pedicels short, 6–8 mm. long, with glandular-denticulate bracts at the base; (5) petals ovate, long-acuminate, joined for over two-thirds entire length; (6) style entire and stigma punctiform.

Great difficulty was experienced in making dissections of the ovary of this species. Because the flowering material was sparse only three dissections could be made. The ovary appeared one-celled, with no apparent septa separating the ovules into more than one compartment. The undivided punctiform stigma and the terete unmarked style would seem to bear out this conclusion. However, the ovaries were all rather flattened, making positive conclusions impossible.

Most closely allied to this species is *T. grandiosa*. These two species from a vegetative point of view appear identical. However, *T. grandiosa* can be separated by its habit (tree 12 m. high), the punctate-dotted under-surface of the leaves, the longer pedicels (1–2 cm. long), the long-ovate bracteoles (6–8 mm. long, 4 mm. wide), the profuse, deep glandular-denticulations along the margin with the indentations measuring nearly 0.5 mm., the larger petals and the two-parted style.

It is a pleasure to name this species in honor of Dr. H. A. Gleason, Curator of the herbarium of the New York Botanical Garden.

5. ***Ternstroemia discoidea*** Gleason in Bull. Torrey Bot. Club, **58**: 398. 1931.

Ternstroemia monosperma Gleason, op. cit. **58**: 399. 1931. Syn. nov.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, slopes of Ridge 25, alt. 1700–1800 m., *G. H. H. Tate* 405 (TYPE, NY), Nov. 26, 1928 (bush 8 ft.; flowers white). — Mount Duida, Central Camp, alt. 1450 m., *G. H. H. Tate* 1019 (TYPE of *T. monosperma*, NY), Aug. 1928 – Apr. 1929.

Bush 3 m. with young branchlets verticillate, gray, angled, striate. Leaves coriaceous, elliptic-oblong or cuneate-oblong, 3.0–5.5 cm. long, 1.0–2.5 cm. wide, rounded and minutely retuse at apex, cuneate at base, the margin finely crenulate, the crenulations showing only near apex because of revolute sides, dark-punctate below, the midrib canaliculate above, raised below, the veins inconspicuous, the petiole 5–8 mm. long. Flowers solitary, crowded at base of the shoots of the season's growth; pedicel slender, recurved, up to 2.8 cm. long; bracteoles 2, minute, opposite or

alternate, one present immediately below the sepals and a second further down the pedicel, long-ovate, ca. 2 mm. long, glandular denticulate; sepals suborbicular 3–4 mm. long, 4–5 mm. wide, the outer lobes glandular-denticulate, the inner lobes with entire scarious margins; petals 5, broadly obovate, 5–6 mm. long, 3–4 mm. wide, joined at the base; stamens +100, uni-seriate?, ca. 3 mm. long, their slender filaments joined at base, ca. 1.5 mm. long, adnate to base of corolla, the anthers linear, ca. 1.5 mm. long, the connective projected into a short apicule, 0.3–0.5 mm. long; ovary conical, flat, apparently single-celled; the style 2 mm. long, the stigma peltate. Fruit conical-ovoid, ca. 1.3 cm. long, 1-celled, 1- or 2-seeded, the seeds ovoid, 7 mm. long; fruiting calyx accrescent, the sepals enlarged to nearly 9 mm. width.

The angled, striate branchlets, the small, thick, cuneate leaves, the rounded sepals, small in anthesis, later accrescent, the peltate stigma, the one-celled ovary and the one- or two-seeded fruit all distinguish this species.

Great difficulty was experienced in obtaining a satisfactory dissection of the ovary. Each dissection showed only a minute slit for the cell of the ovary, with a rather thick wall. The fruit was considered by Gleason as only single-seeded, hence the name *T. monosperma* for the fruiting specimen. However, dissections show that the fruit can be two- as well as one-seeded. The accrescent calyx along with the one-seeded fruit were the basis of the species *T. monosperma*. Further study shows insufficient evidence for separating these two species.

6. ***Ternstroemia punctata*** (Aublet) Swartz, Prodr. Veg. Ind. Occ. 81. 1788. — Willdenow, Sp. Pl. 2²: 1128. 1799. — Smith in Rees, Cyclop. 35: no. 4. 1817. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, 1: 410 (Mém. Ternstr. 18). 1822; Prodr. 1: 523. 1824. — Sprengel, Syst. Veg. 2: 595. 1825. — Spach, Hist. Nat. Veg. 4: 62. 1835. — Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 14: 105 (Mém. Ternstr. 17). 1855. — Wawra in Martius, Fl. Bras. 12¹: 270. 1886. — Melchior in Nat. Pflanzenfam. ed. 2: 21: 142. 1925.

Taonabo punctata Aublet, Pl. Guian. 1: 571. 1775; 4: t. 228. 1775. — Szyszyłowicz in Nat. Pflanzenfam. III. 6: 188. 1893.

Ternstroemia revoluta Splitgerber in Van Hoeven & De Vries, Tijdschr. 9: 99. 1842; in Bot. Zeitung, 1: 95. 1843.

Ternstroemia punctata (Aubl.) Swartz var. *revoluta* (Splitg.) Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 14: 105 (Mém. Ternstr. 17). 1855. — Wawra in Martius, Fl. Bras. 12¹: 271. 1886. — Pulle, Enum. Pl. Surinam, 304. 1906.

Mokofua punctata (Aubl.) O. Kuntze, Rev. Gen. Pl. 1: 63. 1891.

DISTRIBUTION: British Guiana, Dutch Guiana, Venezuela, Brazil.

BRITISH GUIANA: Roraima, R. Schomburgk 600 (FM), 937 (G), 1842. — Upper Rupununi River, near Dadanawa, J. S. De La Cruz 1780 (FM, G, Mo, NY, US), July 1922 (8 ft. high). — Upper Mazaruni River, J. S. De La Cruz 2112 (FM, G, Mo, NY, US), 2216 (FM, G, NY, US), Sept.–Oct. 1922 (9–10 ft. high). — Malali, Demerara River, J. S. De La Cruz 2660 (G, Mo, NY, US), Oct.–Nov. 1922. — Kamakusa, Upper Mazaruni River, J. S. De La Cruz 2871 (G, NY, US), Nov. 1922. DUTCH GUIANA: Forest of Zandery, J. A. Samuels 471 (G, NY), May 31, 1936. VENEZUELA: Mount Auyan-Tepui, alt. 1100 m., G. H. H. Tate s.n. (NY) Dec. 1937 – Jan. 1938. BRAZIL: Upper Rio Negro River region, Weiss & Schmidt s.n. (NY), 1917–1918.

Small tree (3–8 m.) with twisted brittle, gray branchlets, not verticillate. Leaves heavy-coriaceous, obovate, 4–6 (–8) cm. long, 2–3 (–4) cm. wide, obtuse or rounded at the apex, emarginate, cuneate at the base, the

midrib canaliculate above, impressed the whole length of the leaf, raised below, the veins (8–11 pairs) raised on the upper surface obscure below, the margin entire, revolute, edged with glands, the under surface copiously dark-punctate, the petiole 3–5 mm. long. Flowers solitary axillary. Pedicels 2–3 cm. long, generally compressed with a row of glands along the angles (seen only under the microscope). Bracteoles 2, quickly caducous, ovate, ca. 6 mm. long, 3.0–3.5 mm. wide, concave, pergamentaceous, keeled, clearly glandular-denticulate along the margin, emarginate, apiculate at the apex, tapering at the base, leaving a small triangular scar when dropping. Calyx-lobes 5, ovate, subequal, 11–12 mm. long, coriaceous (1.5–2.5 mm. thick at base), abruptly long-acuminate, acumen 2 mm. long, distinctly glandular-denticulate on outer lobes, occasionally on inner lobes. Petals 5, ovate, ca. 6 mm. long, 3 mm. wide, membranaceous, long-acuminate, simulating calyx in shape. Stamens ca. 50, bi-seriate, filaments of unequal sizes 0.5–1.0 mm. long, joined at the base; anthers unequal, 1–2 mm. long in same flower, joined. Ovary conical, ca. 2 mm. diam., 3-celled, each cell ca. 3–4-ovulate, tapering at apex into style. Style 3-parted, 5 mm. long, free for 2 mm., parts of unequal length. Stigmas 3, punctiform. Fruit conical, rugose in drying, 3-celled.

The outstanding characters of this species are the entire punctate leaves with veins clearly evident on the upper surface, the long-acuminate petals and calyx-lobes, the latter unusually thick and starlike when expanded, the caducous bracteoles, leaving triangular scars, and the three-parted style and 3-celled ovary and fruit.

Choisy enumerated a var. *revoluta* based on *T. revoluta*. The characters of revolute margin and leaves crowded at apex are insufficient for even varietal delimitation. All species have a tendency toward revolute margins depending a great deal on the thickness of the leaf and the pressing and drying, and the crowding of leaves at the tip of the branchlets is a generic character.

7. ***Ternstroemia delicatula*** Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Wawra in Martius, Fl. Bras. **12**¹: 273. 1886 (excl. spec. Weddell). — Krug & Urban in Bot. Jahrb. **21**: 536. 1896. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. — R. O. Williams, Fl. Trinidad & Tobago, **1**: 70. 1929.

Mokofua delicatula (Choisy) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo delicatula (Choisy) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 118. 1893.

DISTRIBUTION: French Guiana, Trinidad.

FRENCH GUIANA: Cayenne, *Martin s.n.* (ISOTYPE, FM; photos, FM, G). TRINIDAD: Forests near Arima, alt. 600 m., *H. F. A. Eggers 1381* (NY, US).

This species is described as having membranaceous, obovate-elliptic leaves, narrowed at the base into a long petiole (6–15 mm.), obtuse or very shortly acuminate at the apex, 5–9 cm. long and 2–4 cm. wide, quite distinctly crenulate in the upper half, lateral nerves prominulous on both surfaces. The flowers are fairly numerous, crowded on the branchlets. The peduncle is slender, 1–2 cm. long, recurved. The 5 sepals are more or less equal, 5–6 mm. long, obtuse at the apex with eglandular entire margins. The ovary is globose-conical, 3-celled, contracted into a style ca. 4 mm. long which is topped by a subcapitate tri-crenate stigma. Each cell of the fruit is single-seeded.

The membranaceous leaves, the long petiole, the crowded flowers, the thin, recurved peduncle, the eglandular sepals and the tri-crenate subcapitate stigma are the distinguishing characters for identification.

8. **Ternstroemia Browniana**, sp. nov.

Arbor 6 metralis, ramulis subverticillatis teretibus striatis griseis. Folia coriacea, obovata, 4–6 cm. longa et 1.5–2.5 cm. lata, apice roundata vel obtusa, basi in petiolum attenuata, margine crenulata, subrevoluta, costa supra canaliculata, subtus elevata, venis non visibilibus, petiolis 3–5 (–7) mm. longis. Flores [*Sandwich 393*] axillares, solitarii, pedicellis 2.0–2.5 cm. longis gracilibus; bracteolis 2, oppositis inaequalibus deltoideis vel ovatis ca. 3 mm. longis, 2.0 et 2.5 mm. latis, revolutis, margine glanduloso-denticulatis; sepala 5, imbricata, subaequalia, erecta vel recurva, ca. 5 mm. longa et 4 mm. lata, margine integerrima, scariosa; petala 5, subaequalia, 5–6 mm. longa et 2 mm. lata, basi 4 mm. connata, lobis obtusis orbicularibusque; stamina ca. 30, uni- vel bi-seriata, 4.0–4.5 mm. longa, filamentis crassis 0.5–0.8 mm. longis, basi connatis et ad corollam adnatis, antheris linearibus 2.0–2.5 mm. longis, connectivo 1 mm. vel minus projecto; ovarium conicum, ca. 2 mm. longum, 3-loculatum, loculis 1-ovulatis, stylo 25+ mm. longo, stigmatibus punctiformi. Fructus [*Hitchcock 17306*] globosus, ca. 1 cm. longus, 8–9 mm. diam., 3-loculatus, loculis 1-seminatis, stylo crasso 6 mm. longo, stigmatibus punctiformi; seminibus ca. 6 mm. longis. Fructus sepala 5–8 mm. longa et 4–5 mm. lata.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Rockstone, sandy scrub, *A. S. Hitchcock 17306* (TYPE), NY; G, US), Dec. 31, 1919 – Jan. 1, 1920 (tree 20 ft. high). — Essequibo River, Moraballi Creek, near Bartica, in wallaba forest on sandy ridge, alt. near sea-level, *N. Y. Sandwich 393* (NY, US), Oct. 7, 1929 (tall tree 78 ft. high, 8 in. diam.; sepals pinkish purple within; petals united, white, yellow at top; flowers very beautiful, fragrant like a sweet soap). — Northwest District, Barima River, lat. 8° 20' N., long. 59° 50' W., *J. S. De La Cruz 3387* (FM, G, NY), Mar. 19–22, 1923 (10 ft. tall). — Malali, Demerara River, lat. 5° 35' N., *J. S. De La Cruz 2666* (FM, G, NY), Oct. 30 – Nov. 5, 1922.

For some time the type of this species (*Hitchcock 17306*) has been known to be specifically different from *T. delicatula*, its nearest relative. Various workers have commented through annotations on the likenesses and differences, but no one described it as new. The name *T. Browniana* is selected in memory of the late Dr. N. E. Brown, formerly of Kew, who studied this specimen as well as many other collections from British Guiana.

Since *Hitchcock 17306* is strictly a fruiting specimen, the above description of the flowering parts was drawn from *Sandwich 393*.

The resemblance to *T. delicatula* is found in the entire, scarious-margined, small (5 mm. long) calyx-lobes, the 3-celled ovary and fruit with a single ovule and seed to each locule, and the slender pedicel. The differences from *T. delicatula* lie in the punctiform rather than subcapitate, tri-crenate stigmas, the coriaceous veinless leaves, shorter and rounded at the apex and the shorter petiolate rather than the membranaceous, oblong-elliptic, delicately veined leaves, more acuminate at the apex and with petioles 10–15 mm. in length.

9. **Ternstroemia alnifolia** Wawra in Martius, Fl. Bras. **12**¹: 275. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Ternstroemia alnifolia Wawra var. *lancifolia* Wawra, l. c.

Mokofua alnifolia (Wawra) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo alnifolia (Wawra) Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Brazil.

No specimens examined.

Leaves obovate, 10–12 cm. long, 4–5 cm. wide, rounded or emarginate at apex, attenuate at base, the midrib impressed above, prominent below, ferruginous and nigro-punctate below, veins ca. 7, the margin serrate-repandulate, the petiole ca. 1 cm. long. Flowers solitary, the peduncles 1.5–2.0 cm. long, usually erect; bracteoles minute, coriaceous, oblong, subacute, conspicuously glandular-denticulate; calyx-lobes coriaceous, ca. 1 cm. long, the outer lobes oval, glandular, the inner lobes orbicular, entire; petals three-fourths as long as sepals, connate at base, concave, connivent before anthesis, narrowed at base; stamens bi-seriate, three-fourths as long as petals, the filaments flat, wider than the anthers, very short, the anthers linear-oblong, nearly five times longer than the filaments, truncate at apex with a short mucron; ovary ovoid, somewhat 3-sided, sulcate due to the impression of stamens, 3-celled (or 5–6-celled), 2 ovules in each cell or if 6-celled, 1-ovulate, the style short, hardly equalling the ovary in length, thick, 3–5-angled, the stigma orbicular, tri-crenate, lobes often bi-sulcate. Fruit globose, ca. 1.5 cm. long, the seeds oblong-obovate, 8 mm. long.

Although no material has been available for the study of this species and even though it is closely allied to and invades the range of *T. brasiliensis*, there can be no doubt of its status. The outstanding characters are (1) the very short tri-partite style and peltate stigmas; (2) the 3-celled (or 5–6-celled) ovoid ovary; (3) the truncate stamens; (4) the glandular bracteoles and outer calyx-lobes and (5) the leaves nigro-punctate below.

Listed in the Index Kewensis is *Taonabo ulmifolia* Szyszyłowicz but not *Taonabo alnifolia* Szyszyłowicz. Since Szyszyłowicz did not include the former in his work, one may assume that *T. ulmifolia* is merely a typographical error for *T. alnifolia*.

10. ***Ternstroemia brevistyla***, sp. nov.

Ramuli grisei, teretes. Folia coriacea, obovata vel elliptica, 3.0–5.5 cm. longa et 2.0–3.2 cm. lata, apice rotundata, rare retusa, basi late cuneata, margine plana ad apicem crenulata, costa supra leviter impressa, subtus leviter elevata, undique ad apicem evanida, nervis non visibilibus, petiolis 4–8 mm. longis. Flores non visi. Fructus solitarii, axillares, subglobosi, ca. 7 mm. longi et 5–6 mm. lati, 3-loculati (rare 4-loculati) loculis 1-seminatis; pedicellis 6–8 mm. longis; bracteolis 2, inaequalibus, oppositis, suborbicularibus vel late ovatis, 2.5 × 2 mm. vel 3 × 3 mm., margine glanduloso-denticulatis; sepala 5, imbricata, suborbicularia, 4–6 mm. longa et ca. 5 mm. lata, exterioribus sparse glanduloso-denticulatis, interioribus margine scariosis; stylo breve 1 mm. vel minus longo, sulcato, stigmatibus subcapitato, 3-crenato.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Auyan-Tepui, alt. 1100 m., *G. H. H. Tate 1149* (TYPE, NY; US), Dec. 1937 – Jan. 1938.

This species is most closely related to *T. discoidea*. However, from this latter species it can be separated by the very brief style, the 3-celled fruit

and the tri-crenate, subcapitate stigma. The only feature of resemblance is the leaf.

Ordinarily the fruit of *T. brevistyla* is 3-celled and the stigma tri-crenate. Occasionally, the fruit is 4-celled and when such is the case, the stigma is 4-crenate. The very brief style is probably the shortest among the American species.

11. ***Ternstroemia penduliflora***, sp. nov.

Arbor 9 m. metralis (fide coll.), ramis teretibus griseis, ramulis teretibus griseo-brunneis. Folia membranacea (juvenilia), elliptica vel obovata, 12–16 cm. longa, 2.5–4.5 cm. lata, undique opaca, apice acuminata, basi longa attenuata, margine plana et subcrenulata, costa supra canaliculata apice evanida, subtus conspicua, venis 20–30 paribus ramosis haud conspicuis, petiolis circa 1.5 cm. longis. Flores solitarii, proxime positi, pedicellis gracilibus pendulis circa 4 cm. longis rubro-brunneis; bracteolis 2 oppositis inaequalibus ovatis 5–8 mm. longis et 2.5–3.0 mm. latis, distincte longeque acuminatis, margine integerrimis; sepala 5, late obovata, 7–10 mm. longa et 2.5–3.0 mm. lata, apice rotundata vel subtruncata, rostrata margine exterioribus sparse glanduloso-denticulatis, interioribus scariosis; petala 5, oblongo-obovata, circa 8 mm. longa, 3–4 mm. lata, 4 mm. connata, apice truncata vel rotundata, margine crenulata; stamina circa 40, uniseriata, 5–6 mm. longa, apiculata, filamentis 1 mm. minusve longis, basi connatis, ad corollam adnatis, antheris linearibus circa 3 mm. longis, apiculis 1 mm. plusve longis; ovarium conicum, sulcatum, circa 3 mm. longum 3-loculatum, loculis 2 plusve ovulatis, stylo ca. 3 mm. longo, stigmatibus punctiformi. Fructus non visus.

DISTRIBUTION: Peru.

PERU: Dept. Loreto, Mishuyacu, forests near Iquitos, alt. 100 m., *G. Klug 1487* (TYPE, NY), May–June 1930 (tree 9 m. high; flowers white and rose).

The outstanding characters of this species are: (1) the long, membranaceous, acuminate many-nerved leaves; (2) the long (4 cm.) pendulous graceful pedicels, closely arranged on the axis; (3) the long (up to 8 mm.) ovate, distinctly acuminate bracteoles; (4) the truncate petals (8 mm. long), joined one-half their length; (5) the stamens (5–6 mm. long) with apicules usually longer than the filaments; (6) the 3-celled ovary and the punctiform stigma.

Closely allied to this species and known from the same type locality is *T. Klugiana*. Features of *T. penduliflora* separating it from the latter are the long pendulous pedicels, the larger membranaceous leaves, the longer, acuminate bracteoles and larger sepals and the 3-celled ovary.

The leaves on the type specimen are truly membranaceous, but they are apparently very young. It is highly probable that on maturity these leaves will become coriaceous.

12. ***Ternstroemia Candolleana*** Wawra in Martius, Fl. Bras. **12**¹: 373. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. — Gleason in Bull. Torrey Bot. Club, **58**: 395. 1931.

Taonabo Candolleana (Wawra) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893. *Ternstroemia Candolleana* Wawra var. *rotundata* Wawra in Martius, Fl. Bras. **12**¹: 274. 1886.

DISTRIBUTION: Brazil.

BRAZIL: State Amazonas, Rio Negro, near Barra, *R. Spruce 1544* (ISOTYPE, G, NY; photo FM), July 1851. — Same locality, *L. Riedel 1593* (ISOTYPE G; fragment FM). — Muyrapenima, river banks and flood sands on the Rio Negro, *G. H. H. Tate 61* (NY, US). — Along Guiania river above the mouth of the Casiquiari river, *R. Spruce 3496* (ISOTYPE of var. *rotundata*, G, NY; fragment & photo FM).

Leaves chartaceous to subcoriaceous, oblong-obovate, 7-10 cm. long, 1.5-3.0 cm. wide, acuminate to obtuse at the apex tapering gradually at base into petiole, shining above, ferruginous below, 7-8 pairs of veins hardly perceptible, the margin plane to subrevolute, entire to subcrenulate, the petiole 1 cm. long. Flowers solitary, the pedicels 2-4 cm. long, filiform; bracteoles 2, opposite unequal, 5-8 mm. long, ovate-lanceolate, acute, the second bracteole shorter ovate; calyx-lobes 5, imbricate, ca. 1 cm. long in flower, 0.7 cm. wide, obtuse at apex, as much as 1.3 cm. long and 1 cm. wide in fruit, the margin scarious, not glandular-denticulate; corolla 9 mm. long, fused at base into a tube 4 mm. long, the petals 5, ovate, subacute; stamens 50, bi- or tri-seriate, caudate, the filaments 1 mm. long, connate at base and adnate to corolla, the anthers 4 mm. long, linear; the cauda 2 mm.+ long; ovary subconical, 2 mm. diam., 3-celled, each cell 2-ovulate; style long for the genus (7-11 mm.); stigma punctiform. Fruit ovate or subconical, sulcate, 1.0-1.5 cm. long, 3-celled, usually 6-seeded; seeds 6-8 mm. long.

The outstanding characters of this species are: (1) the corolla fused for one-half its entire length into a tube; (2) the large calyx-lobes (up to 1.5 cm. in fruit); (3) the elongated style (up to 11 mm.); (4) the long-caudate stamens, the cauda 2 mm. or more long.

12A. ***Ternstroemia Candolleana*** Wawra var. ***angustifolia*** Wawra in Martius, Fl. Bras. **12**¹: 274, 1886. — Gleason in Bull. Torrey Bot. Club, **58**: 395, 1931.

DISTRIBUTION: Brazil.

BRAZIL: Camanáos, flooded grounds on the Rio Negro, *G. H. H. Tate 125* (NY, US).

In floral characters, this variety matches the species most accurately and because of the elongated style, large calyx-lobes and the filiform pedicel must be retained in close association. The leaves, however, are most distinctive for the genus. They are submembranaceous, long-linear, 8-13 cm. long and seldom exceed 1.5 cm. in width, taper gradually at both ends and along the margin are plane and slightly crenulate toward the apex.

13. ***Ternstroemia subcaudata***, sp. nov.

Arbor vel frutex 3-9 metralis, ramulis rugosis teretibus griseis. Folia coriacea vel subcoriacea, oblongo-ovata, 6.5-8.5 cm. longa et 1.5-2.7 cm. lata, apice longo-acuminata vel subcaudata, basi in petiolum attenuata, margine integerrima et plana, costa supra impressa, subtus elevata, venis obscuris, petiolis 1.0-1.5 cm. longis. Flores solitarii, pedicellis gracilibus 1.0-1.5 cm. longis, bracteolis 2 suboppositis inaequalibus ovatis 0.7-1.4 mm. longis et circiter 1 mm. latis acuminatis, margine glanduloso-denticulatis; sepala 5, imbricata, inaequalia, 3.0-4.5 mm. longa, 2.5-4.0 mm. lata, exterioribus lato-ovatis brevioribus crassioribusque, margine scarioso-fimbriatis (non glanduloso-denticulatis), interioribus suborbicularibus, margine scariosis; petala 5, ovata, basi ad medium connata, 4-5 mm. longa, margine scariosa; stamina circiter 35, uni-seriata, inaequalia, 3-4 mm. longa, filamentis crassis 1 mm. vel minus longis, basi connatis et ad

corollam adnatis, antheris circiter 1.5 mm. longis oblongis, connectivo longo-caudato 1 mm. vel plus projecto; ovarium conicum vel subglobosum, circiter 1.5 mm. longum, 3-loculatum, loculis 1-ovulatis, stylo crasso circiter 2.5 mm. longo, stigmatе punctiformi. Fructus ignotus.

DISTRIBUTION: Brazil.

BRAZIL: State Amazonas, Rio Negro, near Manáos, *E. Ule* 8921 (TYPE, US), August 1910 (tree or shrub 3-9 m.; flowers reddish yellow).

The subcaudate coriaceous leaves with obscure veining, the long-caudate connective in the stamens and the punctiform stigma are characters of importance in distinguishing this species and separating it from its nearest relative, *T. delicatula*. These two species are allied by the three-celled ovary with a single ovule in each cell.

14. **Ternstroemia Schomburgkiana** Benth in Hooker, London Jour. Bot. **2**: 362. 1843. — Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 105 (Mém. Ternstr. 17). 1855. — Wawra in Martius, Fl. Bras. **12**¹: 272. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Mokofua Schomburgkiana (Benth) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo Schomburgkiana (Benth) Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Dry savannahs near Roraima Mt., *R. Schomburgk* 967 (photo, FM, G).

Branchlets grayish, terete, comparatively smooth, sometimes verticillate. Leaves coriaceous, obovate, up to 7 cm. long and 3 cm. wide, obtuse or rounded at apex, obtusely cuneate at base, entire or inconspicuously serrulate, ca. 8 pairs of veins evident only on the upper surface, punctate below, the petiole 6-7 mm. long. Flowers 4-5-aggregate at the tips of the branchlets; pedicels 7-8 mm. long; bracteoles ovate, ca. 1.5-2.0 mm. long, apiculate, glandular-denticulate; calyx-lobes ovate, acute, 5-6 mm. long, glandular-denticulate; petals acute, equalling the calyx-lobes in length; stamens uni-seriate, ca. 20, shorter than the petals, the filaments very short, thick; ovary (fide Wawra) 3-celled, the cells 3-4-ovulate, the style longer than the ovary.

The foregoing description is based upon those of Benth (1843) and Wawra (1886) along with a photograph of *Schomburgk* 967 in the Berlin herbarium. There are discrepancies between Benth's original description and Wawra's interpretation. Not only do Wawra's measurements vary considerably from those of Benth, but he also misinterprets those of Benth. Wawra states that Benth recorded the pedicel length as 2 cm. Actually, Benth states that the pedicels are 4 lines long, which when metrically interpreted would be 8 mm. Wawra states that the bracteoles are 5 mm. long, the calyx-lobes 1 cm. long and that the latter are rounded (key). Examination of the photograph shows the bracteoles to be only 1-2 mm. long, at the most, and the calyx-lobes acute and 5-6 mm. long.

Cited here questionably might be *Pinkus* 281 (FM, Mo, NY, US), collected in British Guiana, Feb. 3, 1939 on the Arubaru River (Kako tributary), upper Mazaruni drainage, near Haiamatipu Mt., alt. 600 m. (shrub

on marshy savannah; petals white, pink tinged; fruit yellow). This specimen agrees with the original description and the photograph of the type in all details, except that it possesses a 2-celled rather than a 3-celled ovary.

15. **Ternstroemia brasiliensis** Cambessèdes in A. St. Hilaire, Fl. Bras. Mer. **1**: 298, t. 59. 1827. — Spach, Hist. Nat. Veg. **4**: 61. 1835. — Walpers, Repert. Bot. Sept. **1**: 369. 1842. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 105 (Mém. Ternstr. 17). 1855 — Wawra in Martius, Fl. Bras. **12**¹: 271. 1886; in Warming, Symb. Fl. Bras. Centr., Pt. 32. 880. 1889. — Usteri, Fl. Sao Paulo, 205. 1911. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Ternstroemia brasiliensis var. *minor* Cambessèdes in A. St. Hilaire, Fl. Bras. Mer. **1**: 298. 1827.

Ternstroemia brasiliensis var. *parvifolia* Wawra in Martius, Fl. Bras. **12**¹: 272. 1886.

Mokofua brasiliensis (Cambessèdes) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo brasiliensis (Cambessèdes) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: Brazil.

BRAZIL: Rio de Janeiro: *L. Riedel* 79 (G, NY); 1412 (US). — *Wilkes* U. S. Expl. Exped. s.n. (US). — *A. Glaziou* 8278 (AA, NY), 13566 (AA, FM, NY), Feb. 29, 1932 (tree). — Capirari, fields, *A. St. Hilaire* s.n. (type of var. *minor*, photo and fragment, FM). Minas Geraes: *I. F. Widgren* 137 (US), Dec. 11, 1845. — *A. F. Regnell* s.n. (US). — Ouro Preto, Campo Grande, Serra de Ouro Preto, Campoeira em pedras, *M. Barreto & J. Badini* 9142 (FM), Aug. 15, 1937 (tree 3 m.). — Serra da Piedade, Caeté, campo, *M. Barreto* 5442 (FM), May 6, 1934 (tree 2 m.). — Barbacena, fields, *A. St. Hilaire* s.n. (TYPE, photo FM) (fl. December). — Lagoa Santa, *E. Warming* s.n. (FM, US). — Jacarehý, in forest, *P. Dusen* 16114 (Mo) or 16144 (G). — Precise locality lacking, *F. Sello* 52 (G).

Small trees or shrubs. Leaves coriaceous, oblong-obovate to lanceolate, 6–13 cm. long, 2.0–4.5 cm. wide, obtuse at apex, tapering at base into petiole, opaque, green above, yellowish green below, granular punctate, upper half subentire or serrulate, revolute, 7–9 pairs of veins somewhat conspicuous above, the petiole 1.0–1.5 cm. long. Flowers axillary, usually solitary, the peduncles seldom over 2.5 cm. long; bracteoles 2, opposite, 2–4 mm. long, ovate or rounded, glandular-denticulate, keeled; calyx-lobes 5, imbricate, suborbicular to broadly ovate, concave, pergamentaceous, unequal, the outer lobes smaller, 6–7 mm. long, 5–7 mm. wide, glandular-denticulate, the inner lobes 8–9 mm. long, 7–8 mm. wide, the margin scarious; petals 5, ovate, 8 mm. long, 3–5 mm. wide, joined for 3 mm.; stamens ca. 45, bi-seriate, the filaments ca. 1.5 mm. long, compressed, adnate, the anthers linear, ca. 5 mm. long, apiculate; ovary globose, ca. 4 mm. diam., usually 3-celled, occasionally incompletely 5–6-celled, the locules usually 2-ovulate, the style sturdy, ca. 5 mm. long, somewhat compressed, the stigma punctiform with 3 distinct circular stigmatic surfaces (visible only under binoculars). Fruit globose to ovoid, up to 1.5 cm. long, primarily 3-celled, may appear 4–5–6-celled, few seeded, often one to each locule.

Closely allied, if not identical, is *T. venosa* Sprengel. Clearly described by Sprengel, *T. venosa* has been ignored by all botanists or classified as dubious or “little known.” It cannot be considered a dubious species since it was the first species of this genus described from eastern Brazil. It may be that the type collected by *C. F. Otto* has been lost or destroyed. However, Sprengel later cited a second specimen collected by *F. Sello*. At any rate, it seems that no botanist dealing with the genus has made much

of an effort to see the type of this species. A few features of *T. venosa* may, at first, seem alien to *T. brasiliensis*. The leaf is described as lanceolate. *Widgren 137* has typically lanceolate leaves. Sprengel describes the fruit as two-celled, eight-seeded. *Barreto 5442* has fruit which, when sectioned near the apex, is two-celled, and when sectioned near the base appears four-celled. Incidentally, although Cambessedes describes the fruit as three-five-celled, his illustration shows a four-celled capsule. The fruit of *Barreto & Badini 9142*, when sectioned near the apex, appears two-celled, lower down it appears three-celled in section and near the base incompletely six-celled. *Riedel 327* in fruit is three-celled, six-seeded. On the same specimen are fruits that are five-celled (probably incompletely so), also six-seeded. These variations are not unusual in the genus.

Sprengel in describing *T. venosa* states "pedunculi axillares, aggregati, brevissimi" and "Corolla quinquepartita, calyce duplo longior." In *T. brasiliensis*, the peduncles are solitary and ca. 2.5 cm. long and the corolla is only slightly longer than the calyx. Wawra (1886) also refers to the pedicels as aggregate. In the material examined by me, the pedicels are always solitary. If Sprengel were comparing the corolla lobes with the outer calyx-lobes, his statement concerning the corolla length might be applied to *T. brasiliensis*.

If these two species prove to be identical, as seem likely, the name *T. venosa* Sprengel (1821) must be retained in place of *T. brasiliensis* Cambessedes which was described in 1827, six years later.

16. ***Ternstroemia globiflora*** Ruiz & Pavon, Syst. Veg. Fl. Peruv. Chil. 179. 1798. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 412 (Mém. Ternstr. 20). 1822; Prodr. **1**: 524. 1824. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 104 (Mém. Ternstr. 16) 1855.

Ternstroemia globuliflora Steudel, Nom. Pl. ed. 2, **2**: 669. 1841. Sphalm.

Ternstroemia globosa Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 104 (Mém. Ternstr. 16). 1855.

Ternstroemia minoriflora Hochreutiner in Ann. Conserv. & Jard. Bot. Genève, **20**: 192. 1917. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

DISTRIBUTION: Peru.

PERU: In Andium silvaticis frigidis versus Pillao vicum, *J. Pavon s.n.* (TYPE, Madrid; fragment & photo, FM). — Without locality, *J. Pavon s.n.* (photo of specimen labeled *T. globosa*, Geneve; FM). — Without locality, *J. Pavon s.n.* (type of *T. minoriflora* Geneve; fragment & photo, FM). — Dept. Ayacucho, Aina, between Huanta and Río Apurimac, open woods, alt. 750–1000 m., *E. P. Killip & A. C. Smith 22552* (US), May 1929 (tree 30–40 ft. with white fleshy petals). — Dept. Libertad, Prov. Patáz, valley of the Mishiollo River below Ongóu, alt. 1300 m., *A. Weberbauer 7064* (G, US), Aug. 1914 (shrub 5 m. high with pale yellow flowers).

Small tree or shrub. Leaves broadly lanceolate, elliptic or obovate, often asymmetrical, subcoriaceous, acuminate or subacuminate at apex, cuneate at base, 6–8 pairs of veins visible on lower surface, the margin plane, entire, the petiole 5–7 mm. long. Flowers rather small, axillary, solitary; pedicels 0.7–1.8 cm. long, compressed; bracteoles 2, opposite rounded or triangular 1–2 mm. long, not glandular-denticulate; calyx-lobes 5, suborbiculate, the outer two smaller, 2.5–3.0 mm. long, the inner three 4–5 mm. long, scarious margined not glandular-denticulate; corolla white or pale yellow, gamopetalous, calyptrate, globose, ca. 3 mm. long,

nearly cleistogamous, the wall 1 mm. thick, 5 minute lobes at apex, imbricate, suborbicular, less than 1 mm. long; stamens 10–16, adnate to base of corolla, uni-seriate, not over 2 mm. long (over all), the filaments various lengths, 0.5–2.0 mm. long, fused sometimes their entire length swelling at center, decreasing near apex, with two anthers appearing at apex, the anthers minute usually ovate, ca. 0.5 mm. long, two-celled, basifixed; ovary conical, sulcate, ca. 1 mm. long, 1.5 mm. diam. at base, two-celled, 1–2-ovulate, ovules attached at apex, the ovary tapering through style (1 mm. long) into a punctiform stigma. Fruit ovate, ca. 1 cm. long and 1 cm. diam., the seeds 2–3, buff colored, covered with reddish-brown mealy coating, ca. 9 mm. long and 5 mm. diam.

At my disposal were fragments and photographs of the types of both *T. globiflora* and *T. minoriflora*. Of the former, one flower bud was available. There is no doubt that the two are synonymous. Fortunately, the two other specimens cited above (*Weberbauer 7064* and *Killip & Smith 22552*) furnished flowers and fruit for dissection. I was most anxious to dissect the flower after reading Hochreutiner's excellent treatment under *T. minoriflora*. The globose, calyptrate, nearly cleistogamous corolla is a most unusual character in the genus. Ruiz & Pavon undoubtedly recognized this character when they utilized the name *T. globiflora*, but their description was so simple and incomplete that botanists were unable to associate unnamed material with the species. However, after Hochreutiner's enlightening treatment, one can see in Ruiz & Pavon's description, "corollis globosis quinquentatis" that the two authors really understood the significance of their species as against *T. quinquepartitis* "corollis quinquepartitis," the latter expression causing considerable controversy. Both species were either dropped or ignored by most authors until now.

In the eyes of some workers this species might constitute the basis for a new genus. However, many species in the Theaceae in early flower present the same globose appearance of the corolla. Often, it is impossible to separate the corolla-lobes, so tightly do they overlap in the bud. In this species, the lobes are thicker and a nearly complete coalescence has actually taken place.

17. ***Ternstroemia congestiflora*** Triana & Planchon in Ann. Sci. Nat. sér. 4, **18**: 259. 1862. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Mokofua congestiflora (Triana & Planchon) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo congestiflora (Triana & Planchon) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Boyaca, vicinity of Tunja, *Purdie s.n.* (ISOTYPE, G). — Precise locality unknown, *J. C. Mutis 1116* (US).

Branchlets terete, thick subverticillate. Leaves heavy-coriaceous, oblong-ovate to oblong-elliptic, 5–8 cm. long, 2–3 cm. wide, obtuse, emarginate at apex, cuneate at base, 7–8 pairs of branching veins distinct on lower surface, the margin entire or subcrenulate near apex, revolute or subrevolute, the petiole 4–7 mm. long. Flowers axillary, solitary, the pedicel 4–5 mm. long in type (2 cm. in *Mutis 1116*), sturdy, 2 mm. diam.; bracteoles 2, opposite, ca. 3 mm. long, 4 mm. wide, obtuse, rounded at apex,

scarious margined, not glandular-denticulate, keeled on dorsal surface; calyx-lobes imbricate wider than long, 5–6 mm. long, 6–7 mm. wide, orbicular, scarious-margined, not glandular-denticulate, concave, pergamentaceous; corolla lobes ca. 8 mm. long, 6 mm. wide, obtuse at apex; joined at base by thick band 1 mm. or more wide; stamens ca. 60, 4.0–4.5 mm. long, the filaments 2–3 mm. long, the anthers oblong, 1.5–2.0 mm. long; ovary subconical, ca. 4 mm. diam. near base, 2-celled, few-ovulate; style short, stocky, 2.5–3.0 mm. long, 1 mm. diam.; stigma decidedly bi-crenate, involute. Fruit not seen.

Outstanding characteristics of this species are the thick, sturdy branchlets, the heavy-coriaceous leaves, the branching veins clearly distinct on the lower surface, the globose corolla and, in the type, the very short pedicels.

The corollas appear globose, similar to those of *T. globiflora* R. & P. from Peru. The calyx-lobes are extremely concave and fail to turn back at maturity. Of all the flowers examined, none were found in which the corolla had actually opened. Even though the calyx-lobes were spread the corolla appeared as a small globe, not with minute lobes at the apex as in *T. globiflora* but with the petals compactly compressed. The outline of the outer petal can be discerned, but unlike most species, one cannot tease the petals open. Frankly, I doubt if the petals ever open. The whole corolla can easily be lifted intact from the ovary and stigma. At the base, the corolla is thickened for a millimeter or more in length as though bound by a rubber band. The stamens adhere to the walls of the corolla.

The ovary is thicker than in most species, 4 mm. in diameter. The style is also thickened and the stigma is crenately two-lobed. In the type the pedicel is very short, 5 mm. or less. However, in the fragmentary *Mutis 1116* the pedicel is approximately 2 cm. long. This is the only difference between the two specimens.

18. ***Ternstroemia distyla***, sp. nov.

Ramuli subverticillati, grisei, teretes. Folia coriacea, elliptico-lanceolata, 4.5–6.5 cm. longa et 1.0–1.5 cm. lata, apice basique acuta, margine plana vel subrevoluta, distincte denticulata, subtus punctata, costa supra canaliculata, subtus leviter elevata, nervis non visibilibus, petiolis 5–7 mm. longis. Flores non visi. Fructus (probabiliter immaturus) solitarius, conicus, ca. 5–8 mm. longus et basi 5–7 mm. diam., 2-loculatus, pauci-seminatus (ca. 4), pedicellis gracilibus saepe recurvatis 1.3–1.7 cm. longis, bracteolis 2 oppositis ovatis 1.5–2.0 mm. longis et ca. 1.5 mm. latis, margine sparsissime glanduloso-denticulatis; sepala 5, imbricata, semiorbicularia, 3–5 mm. longa et ca. 4 mm. lata, apice rotundata vel obtusa, exterioribus sparsissime glanduloso-denticulatis, interioribus integerrimis; stylo persistente brevissime ca. 1 mm. longo 2-partito ad basim libero, stigmatibus 2 subcapitato-reniformibus.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Auyan-Tepui, alt. 1850 m., *G. H. H. Tate s.n.* (NY, TYPE), Dec. 1937 – Jan. 1938.

This species, although the type presents only immature fruit, is distinct because of the very short, persistent style which in most instances is two-

parted to the base. The elliptic-lanceolate leaves, distinctly crenulate, is another unusual character.

19. **Ternstroemia tristyla** Gleason in Bull. Torrey Bot. Club, **58**: 398. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, Brocchinia Hills, alt. 1350 m., *G. H. H. Tate 584* (TYPE, NY), Jan. 4, 1929 (sepals involute, dull pink).

Branchlets terete, gray. Leaves coriaceous, cuneate, sessile, 2.5–3.0 cm. long, 1.0–1.3 cm. wide, rounded to a minutely retuse apex, cuneate at base, the margin subrevolute with minute glandular teeth, veinless except for an inconspicuous midrib, plane above and slightly raised below. Flowers solitary axillary; pedicels compressed, ca. 1.5 cm. long; bracteoles 2, opposite, chartaceous, oblong-linear, ca. 5 mm. long, 1.25 mm. wide, carinate, glandular-denticulate; sepals 5, imbricate, long and sharp-pointed, involute, 13–15 mm. long, ca. 5 mm. wide at base, pergamentaceous, the outer-lobes sparsely glandular-denticulate; petals 5, imbricate, long-acuminate, resembling calyx in shape, involute, 7–9 mm. long, 2.5–3.0 mm. wide, free nearly to the base; stamens bi-seriate, ca. 35, unequal, 2.5–4.0 mm. long in same series, the filaments variable, 0.5–2.0 mm. long in same series, thick and short to long and slender, connate, adnate to base of corolla, the anthers oblong-linear, 1.5–2.0 mm. long, the connective projected into an acumen up to 0.5 mm. long; ovary very short, rather broad-flattened, 2-celled, each cell 5–6-ovulate, the style 7 mm. long, 2-parted for 3 mm., the 2 pistils punctiform. Fruit not seen.

Following is an enumeration of the outstanding characters of this species: (1) leaves cuneate and sessile, veinless and glandular-margined; (2) style distinctly 2-parted for nearly one-half its 7 mm. length; (3) bracteoles semi-foliaceous, 5 mm. long; (4) sepals and petals long-acuminate and involute, tapering nearly their entire length to sharp pointed apices.

From my study, it appears that *T. tristyla* is an unfortunate name for the species. On the type specimen were two flowers, one of which I carefully boiled and dissected. In a packet on the herbarium sheet were fragments of former dissections. In all, there were styles of four flowers available for observation. These were carefully examined under a high-powered binocular and in each case the style proved to be 2-parted with no evidence of a third part having broken off. To substantiate the observation, the ovary in the flower which I dissected proved to be clearly 2-celled with 5 ovules in one cell and 6 in the second cell. The style is free-parted for less than one-half its entire length and hence should be considered a single style, two-parted at the apex.

In floral characters this species is identical with *T. pungens* Gleason. The sessile, smaller cuneate leaves only sparsely punctate below are the only features separating the two species.

20. **Ternstroemia grandiosa**, sp. nov.

Arbor 12 metralis, ramulis crassis teretibus griseis. Folia crasso-coriacea, oblongo-obovata, 13–19 cm. longa et 5–8 cm. lata, apice obtusa, abrupte acuminata, basi late cuneata, subtus punctata, margine subintegerrima, pauce glandulosa-denticulata, subplana, costa supra canaliculata, subtus elevata, venis 18–20 paribus supra obscuris, subtus subconspicuis, petiolis

crassis, 1.5–2.5 cm. longis. Flores solitarii, pedicellis 1–2 cm. longis, bracteolis 2 inaequalibus longo-ovatis vel lato-ovatis, 6 × 3–4 mm. et 8 × 4 mm., margine glanduloso-denticulatis; sepala 5, imbricata, crassa, ovata vel lato-ovata, inaequalia, 9–12 mm. longa et 7–10 mm. lata, exterioribus margine profunde glanduloso-denticulatis, interioribus margine scariosis; petala 5, lanceolata, 9–10 mm. longa et ca. 3 mm. lata, longo-acuminata, basi 5 mm. connata, apice revoluta; stamina ca. 20, ut videtur uni-seriata, inaequalia, crassa sed fragilia, filamentis crassis 1–2 mm. longis, antheris linearibus ca. 3 mm. longis, connectivo ca. 1 mm. projecto; ovarium subconicum, ca. 2 mm. longum et basi 2 mm. diametro, 2-loculatum, loculis 2-ovulatis, stylo 2-partito, ca. 6.5 mm. longo, apice ad 2 mm. plusve libero, stigmatibus 2 punctiformibus. Fructus ignotus.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Upper Mazaruni District, trail leading to Kamarang from the Kurupung River, on rocky soil, *A. S. Pinkus* 4 (TYPE, NY; US), Sept. 13, 1938 (tree 40 ft. high; trunk 8 in. diam.; flowers flesh-colored).

This species is characterized by the following: (1) tree 12 m. high; (2) thick-coriaceous leaves, punctate on the lower surface; (3) deeply glandular-denticulate outer calyx-lobes; (4) long-acuminate petals, 9–10 mm. long; (5) few stamens (20); (6) long two-parted style.

Most closely related to this species is *T. Gleasoniana*, agreeing in the very large leaves which, however, are thicker, smoother in texture and distinctly free from punctations on the lower surface. As another distinguishing feature, *T. Gleasoniana* has flowers with glandular-denticulate bracts at the base of the pedicels. The sepals of the latter are suborbicular, at least the outer lobes, and are only sparsely glandular-denticulate. The style, in the latter species, is definitely entire.

21. ***Ternstroemia Krukoffiana***, sp. nov.

Arbor 20 metralis (fide Krukoff). Folia coriacea, oblongo-obovata vel oblongo-elliptica, 12–20 cm. longa et 4–5 cm. lata, apice obtusa, abrupte acuminata, basi longo-attenuata in petiolum 2.0–3.5 cm. longum, margine leviter glandulosa ut videtur integerrima, plana vel leviter revoluta, costa supra canaliculata, venis 12–16 paribus supra manifestis subtus obscuris. Flores non visi. Fructus maximus, ovalis vel globoso-ellipticus, 4.0–5.5 cm. longus et 3.5–4.0 cm. diam., biloculatus, loculis solitario-seminatis, seminibus eis *Amygdali* similibus, pulpa carnosae indurata asperatis, ca. 3 cm. longis et 1.5 cm. latis. Pedicelli axillares, solitarii, 2–3 cm. longi, crassi, lignosi, 4 mm. diam., bracteis 2 oppositis 4–5 mm. longis, margine scariosis. Sepala 5, imbricata, pergamentacea, obovata, 8–10 mm. longa et 7–8 mm. lata, margine scariosa, non glanduloso-denticulata.

DISTRIBUTION: Brazil.

BRAZIL: State of Amazonas, Municipality Humayta, on plateau between Rio Livramento and Rio Ipixuna, terra firma, *B. A. Krukoff* 7180 (TYPE, AA; ISOTYPE, FM, NY), Nov. 7–18, 1934 (tree 70 ft.).

Probably the largest fruit of the genus, at least in the Americas, is found in this species (4.0–5.5 cm. long, 3.5–4.0 cm. wide). Furthermore, only one or two seeds are produced. These seeds (when two) fill the fruit case, one to each cell, appear quite similar in appearance to the seed of the almond, and are covered with a reddish brown pulp. Upon drying this

pulp shrinks and cracks into hardened portions which, in turn, appear almost as a crusty stellate pubescence. Whereas in other species this covering is quite powdery or mealy and can be rubbed off easily with the finger, in this species it can be removed only with the aid of a knife or some other sharp implement.

For a species with such unusually large fruit, the calyx-lobes are comparatively small, usually less than 1 cm. long and 7–8 mm. wide. The leaves are oblong-obovate to oblong-elliptic, abruptly acuminate at the apex and tapering gradually at the base into a petiole 3 cm. long, which appears considerably longer because of the extensive tapering of the leaf base.

Most closely allied is *T. macrocarpa* Tr. & Pl., which can be separated from the present new species by: (1) smaller fruit (up to 2.5 cm. long, 2 cm. wide) with 16–18 flat, smooth grayish seeds (7–8 mm. long); (2) shorter and wider leaves abruptly cuneate at the base with 9–11 pairs of veins; (3) much larger calyx-lobes, up to 20 mm. long, 11–14 mm. wide.

It is a pleasure to name this species for Mr. B. A. Krukoff, whose extensive collections in South America and whose interest in the flora of that region are well known.

22. ***Ternstroemia pachyrocha***, sp. nov.

Habitus ignotus. Folia crasso-coriacea, late elliptica vel obovata, 6–8 cm. longa et 3.5–4.5 cm. lata, apice rotundata, subinde subretusa, basi obtusa, in petiolum attenuata, subtus punctata, margine plana integerrima, cum paullis glandulis, costa supra canaliculata, subtus elevata, basi crassa, ca. 3 mm. diam., apice evanida, venis 5–6 paribus, supra profunde vel tenuiter impressis, subtus inconspicuis, petiolis crassis, 5–6 mm. longis. Flores non visi. Fructus subglobosus, 1.7–2.5 cm. longus et 2.2–2.5 cm. diam., 2-loculatus, loculis 5–8-seminatus, seminibus 6–8 mm. longis et 5–7 mm. latis, fructus pericarpio crassissimo 4–6 mm. lato. Pedicelli axillares, solitarii, crassi, 3–4 cm. longi, bracteolis 2 oppositis late ovatis, quam longis latioribus, ca. 3 mm. longis et 5 mm. latis, apice subapiculatis; sepalis 5 imbricatis suborbicularibus, quam longis latioribus, 9–13 mm. longis et 10–15 mm. latis, margine (ut videtur) integerrimis, non glanduloso-denticulatis.

DISTRIBUTION: Peru.

PERU: Dept. Huanuco, Pampayacu, *R. Kanehira* 44 (TYPE, G), Jan. 13, 1927.

Although described from a very poor herbarium specimen, this species is outstanding among all South American species for the large, very thick-walled fruit, from which it derives its name. The pericarp is 5–6 mm. thick and gives the seeds the appearance of being carelessly imbedded in the center of a spongy matrix. Like *T. macrocarpa* Tr. & Pl. and *T. Krukoffiana* Kob., the fruits are borne on strong pedicels. Only a few veins (5 or 6 pairs) are found on the suborbicular leaves. These are deeply and finely impressed on the upper surface but inconspicuous below. Both the sepals and bracteoles are large, wider than long, and the latter are placed close to the sepals.

The species most closely related is *T. macrocarpa* from Colombia. This latter species, although characterized by equally large fruit, can be sep-

arated by the thin walls of the fruit, the larger leaves (9–16 × 5–8 cm.), with veins conspicuously elevated on both surfaces, and the triangular-shaped, keeled bracteoles placed lower on the pedicel.

23. *Ternstroemia macrocarpa* Triana & Planchon in Ann. Sci. Nat. sér. 4, **18**: 259. 1862. — Melchior in Notizbl. Bot. Gart. Mus. Berlin, **13**: 499. 1937. Non Scheffer, 1870.

DISTRIBUTION: Colombia.

COLOMBIA: Forests around Quindio, *Goudot, s.n.* (photo and fragment of TYPE, FM). — Without definite locality, *F. C. Lehmann B.T.862* (NY), *B.T.971* (NY), *B.T.1202* (FM, G). — Dept. El Cauca, Mount El Truena, Cordillera Occidental, shrub-zone ("paramillo"), alt. 2700–3000 m., *F. W. Pennell 7547* (G, NY, US).

Tree. Leaves oblong-obovate, 9–16 cm. long, 5–8 cm. wide, coriaceous rounded or obtuse at apex, obtuse to subcuneate at base, 9–11 pairs of veins conspicuous on both surfaces, granular- or dark-punctate, the margin subcrenulate, plane or slightly revolute, the petiole up to 2 cm. long. Flowers axillary, solitary, the pedicel 2.5–4.5 cm. long, thick, 4–5 mm. diam. at apex; bracteoles 2, subopposite, 5–7 mm. below calyx thick, triangular, keeled, 4 mm. long, the margin scarious, not glandular; calyx-lobes 5, imbricate subligneous, concave, suborbicular, 11–13 mm. long, 11–14 mm. wide (fruiting calyx up to 20 mm. long), the margin scarious, not glandular-denticulate; petals 5, imbricate, suborbicular, 13–15 mm. long, membranaceous; stamens bi-seriate, ca. 60, the filaments thick 1.5 mm. long, joined at the base and adnate to the corolla, the anthers linear, 4–5 mm. long, short apiculate; ovary conical, ca. 4 mm. diam., 2-celled (occasionally 3-celled), few ovules attached at center of ovary near top, the style short, thick (3.5–4.0 mm. long), the stigma evolute 2-parted. Fruit conical, oval, up to 2.5 cm. long, 2 cm. diam., 16–18 seeded. Seeds quite flat, 7–8 mm. long, 5–6 mm. wide.

This species is characterized by large leaves, 9–16 cm. long, 5–8 cm. wide; strong pedicels 2.5–4.5 cm. long, 4–5 mm. thick; large subligneous calyx-lobes 11–13 mm. long (up to 20 mm. long in fruit), 11–14 mm. wide, scarious-margined; large conical fruit up to 2.5 cm. long, 2 cm. wide with 16–18 flat seeds (7 mm. long).

Most closely allied to this species is *T. Krukoffiana*, which has still larger fruit, 4.5–5.5 cm. long and 3.5–4.0 cm. wide, with only one or two huge seeds 3 cm. long and 1.5 cm. wide; calyx-lobes (fruit) not more than 1 cm. long and 0.7 cm. wide; large leaves tapering gradually at the base into a petiole 3 cm. long. Also closely related is *T. pachytrocha*, which can be separated mainly on the very thick pericarp (5–6 mm. thick), the smaller leaves with fewer veins (5–6 pairs) which are deeply imbedded above and inconspicuous below and the broadly ovate bracteoles, wider than long and placed close to the sepals.

24. *Ternstroemia camelliaefolia* Linden & Planchon, Trois Voy. Linden, Bot., Pl. Colomb. **1**: 56. 1863. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. — Sprague in Kew Bull. **1926**: 42. 1926.

Ternstroemia dentata Swartz var. *β. nudiflora* Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 106 (Mém. Ternstr. 18). 1855.

Ternstroemia brevipes Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 103 (Mém. Ternstr. 15). 1855. Pro parte.

Ternstroemia brevipes var. *Blanchetii* Wawra in Martius, Fl. Bras. **12**¹: 275. 1886. — Non Choisy.

Ternstroemia nudiflora (Choisy) Urban in Bot. Jahrb. **21**: 529. 1896. (In observ.)

DISTRIBUTION: Venezuela.

VENEZUELA: State Merida, few miles southeast of Colonia Tovar, alt. 1830 m., *A. Fendler* 50 (G), Apr. 8 & June 22, 1854 and March 14 & May 7, 1855 (tree; fruit opening irregularly; calyx rough, subtended by small bracts). — Colonia Tovar, alt. 2200 m., *A. Jahn* 332 (US), Apr. 1914 (vernacular name "carne asoda"). — Cerro de Turumiquiere, sub-paramo, alt. 1800–2100 m., *G. H. H. Tate* 235 (US).

Tree. Leaves oblong-obovate to broadly obovate, coriaceous, 6–10(–12) cm. long, 3–5 cm. wide, obovate or obtusely acuminate at apex, broadly cuneate at base, green above, reddish tan and dark punctate below, the midrib canaliculate above, raised below, the veins (7–8 pairs) hardly conspicuous above, more evident below, the margin crenulate toward the apex, subrevolute to revolute, the petiole thickened at base 0.8–1.2 cm. long. Flowers axillary, crowded at apex of branchlets, the pedicels short, thick, 4–7 mm. long, 2–3 mm. diam.; bracteoles 2, opposite, subrotund, 3–4 mm. long, a trifle wider, broadly emarginate and cuspidate at apex, almost as large as outer lobes of calyx, the margin scarious, not glandular-denticulate; calyx-lobes 5, imbricate, concave, subrotund, increasing gradually in size from the outer (ca. 5 × 7 mm.) to the inner (8 × 8 mm.), pergamentaceous, concave, the margin scarious, not glandular-denticulate; petals 5, imbricate, joined at base, broadly obovate, 10–11 mm. long, 6–8 mm. wide, scarious-margined; stamens numerous, ca. 5–6 mm. long, anthers and filaments of about equal length, the anthers oblong, not apiculate; ovary abruptly conical, ca. 2.5–3.5 mm. diam., 3-celled, each cell 2-ovulate, sometimes sub-6-celled, the style 3–4 mm. long the stigma tri-crenate, extending well out from the style. Mature fruit (fragmentary) 3 cm. long, the seeds 1 cm. long, probably 6–8 in single fruit; immature fruit (seemingly mature) 1 cm. long.

The outstanding characteristics of this species are (1) the very short, thick pedicels; (2) the scarious margins of the bracteoles and calyx-lobes; (3) the obtuse apex of the anthers; (4) the 3-celled (or 6-celled) ovary and fruit; (5) the tri-crenate stigma; and (6) the large (3 cm. diam.) fruit.

Urban (Fl. Ind. Occ. **3**: 78. 1902), in a bibliographical sketch of Linden, states that only five copies of Linden & Planchon's "Troisième Voyage de J. Linden, Botanique, Plantae Colombianae," in which this species was described, were distributed and that these were allotted to Linden, three other botanists including Urban, and one botanical garden (Brussels). In the same discussion Urban intimates that he considers this distribution of literature to constitute valid publication. Perhaps Urban's comment that only five copies of this work were distributed might be an understatement, since the Arnold Arboretum Library is in possession of a copy procured through Friedländer & Sohn in December, 1911 and Kew also acquired a copy in 1921 from Edouard André. Others may maintain that such a publication does not measure up to Article 35 of the International Code of Botanical Nomenclature (Brussels), since supposedly there was no actual *public* sale or distribution of this work. This becomes merely a matter of personal interpretation. Since a copy of Linden & Planchon's work is at my disposal I would not, under ordinary circumstances, be aware of the

rarity of the publication and would accept the name *T. camelliaefolia* without further thought.

Strangely enough, the only other published name to challenge Linden & Planchon's species is one provided by Urban himself. Urban's combination *T. nudiflora* was made in his observation on West Indian species, and at that time, I am certain, that although he was one of the few to possess Linden & Planchon's publication, he did not realize the existence of *T. camelliaefolia*. He was concerned over *T. brevipes* Choisy, *T. dentata* var. β . *nudiflora* Choisy and *T. brevipes* var. *Blanchetii* Wawra. Hence there is no relationship between his *T. nudiflora* (1896) and his statement (1902) concerning the validity of the work of Linden & Planchon.

However, Urban's *T. nudiflora* (1896) was based on *Funck & Schlim* 173, the same specimen used by Linden & Planchon as the type of *T. camelliaefolia* (1863) and by Choisy as the type of *T. dentata* var. β . *nudiflora* (1855). Later, Melchior (1925), conscious of the two entities, accepted the name *T. camelliaefolia* and reduced *T. nudiflora* to synonymy.

In the copy belonging to the Arnold Arboretum, Linden & Planchon list *T. dentata* var. β . *multiflora* Choisy as a synonym of this species. This was obviously a "lapsus calami," corrected by Sprague (1926) and listed as "*Ternstroemia dentata* β . *nudiflora*" in the republication of Linden & Planchon's new species presented in the Kew Bull. (1926). Sprague, at the same time in an editorial note, stated that *Fendler 50* and *Moritz 1679* were determined by Triana as *T. camelliaefolia*. Since *Fendler 50* has been available for my study, the clue given by Sprague has proved most valuable because Linden & Planchon's description was very incomplete and quite worthless without the type, which I have not seen. However, the dissections from *Fendler 50* and Urban's brief but important supplementary description show that the specimens cited above are true representatives of *T. camelliaefolia*.

25. ***Ternstroemia duidae*** Gleason in Bull. Torrey Bot. Club, **58**: 400. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, slopes of Ridge 25, alt. 1700–1800 m., *G. H. H. Tate 459* (TYPE, NY), Nov. 26 – Dec. 16, 1928 (shrub 6 ft. high; both calyx and corolla pinkish white).

Small shrub 2 m. high with branchlets slender, verticillate, finely striate. Leaves coriaceous, linear-oblongate, 3–5 cm. long, 0.4–0.6 cm. wide, obtuse at the apex, long-cuneate at the base, the margin entire dotted with a few glands, the midrib impressed above, plane below, the veins not visible, the petiole up to 4 mm. long. Flowers few, solitary, axillary, the pedicels slender, recurved, up to 3 cm. long; bracteoles 2, ovate-lanceolate, 4–7 mm. long, the margin entire, perhaps with only an occasional minute glandular-denticulation; sepals 5, imbricate, broadly ovate, ca. 10 mm. long, 6–7 mm. wide, abruptly acuminate-tipped at the apex, the margin of the outer lobes subscarios, that of the inner more so; petals 5, ovate, 9–10 mm. long, 2.5–3.0 mm. wide, long-acuminate, joined at the base for 6 mm.; stamens 30+, unequal, 5–7 mm. long, the filaments somewhat thick, short, 1–2 mm. long, the anthers linear 3–4 mm. long, the connective projecting into an acumen ca. 1 mm. long; ovary conical, ca. 2 mm. long, 2-celled, few-ovulate,

tapering into stout style 5–6 mm. long, ca. 1 mm. diam. near base, the stigma punctiform.

This excellent species is characterized by: (1) linear-oblong leaves, 3–5 cm. long, 0.4–0.6 cm. wide; (2) pinkish white calyx and corolla of nearly equal length (ca. 10 mm.), both long-acuminate with the latter joined for nearly two-thirds its entirety; (3) the large thick stamens; (4) the two-celled ovary; (5) the stout long (6 mm.) style and (6) the fine punctiform stigma.

25A. ***Ternstroemia duidae*** Gleason forma ***latifolia***, nom. nov.

Ternstroemia paucifolia Gleason in Bull. Torrey Bot. Club, **58**: 401. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida, crest of the Savannah Hills, alt. 1300 m., *G. H. H. Tate* 859 (TYPE of *T. paucifolia*, NY), Aug. 1928 – Apr. 1929.

Leaves coriaceous, oblong-cuneate, up to 5 cm. long, 0.6–1.5 cm. wide, rounded, occasionally retuse at apex, long-acuminate at base. Fruit globose, ca. 1.3 cm. diam., 2-celled, 6–8-seeded, the seeds ca. 6 mm. long.

This form is merely a wide-leaved variation of the typical *T. duidae*. Also, it is a fruiting specimen, whereas the species is flowering. The stout style (5–6 mm. long) is persistent and very noticeable. I have selected the name forma *latifolia* in preference to the rather meaningless *paucifolia*. The specimen itself, true enough, has only a single leaf attached at present. However, there are fifty or more leaves loose in an attached packet, which is a considerable number for any specimen of *Ternstroemia*.

26. ***Ternstroemia Lehmannii*** (Hieronymus) Urban in Bericht. Deutsch. Bot. Gesell.

14: 42. 1896. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Taonabo Lehmannii Hieronymus in Bot. Jahrb. **20**, Beibl. **49**: 48. 1895.

DISTRIBUTION: Ecuador.

ECUADOR: Prov. Azuay, western slopes of the West Andes of Cuenca, in dense forests near Chagal and Mollenturo, alt. 2000–2800 m., *F. G. Lehmann* 6674 (ISOTYPES, FM, G, US), Nov. 30, 1893 (tree up to 5 m. high with squarrose and candelabrum-shaped crown of branches; leaves leathery yellow-green, slightly shiny; flowers white).

Small trees up to 5 m. with verticillate, terete, brown or brownish-gray branchlets. Leaves oblong-obovate or rarely elliptic, 8–10 cm. long, 3.5–4.5 cm. wide, coriaceous, obtuse at the apex, contracted into a blunt acumen, rarely subrotund, attenuated at the base into a stout petiole (5–10 mm. long), the margin revolute or subrevolute, subcrenate-serrate, the midrib canaliculate above, prominent below, the veins (8–12 pairs) hardly conspicuous. Flowers axillary, solitary, quite large when open, about 2 cm. across; pedicels sturdy, 1.5–1.7 cm. long; bracteoles 2, opposite, unequal, broadly ovate-triangular or suborbicular, 4–5 mm. long, 3–4 mm. wide, the margin quite entire, with only an occasional glandular-denticulation, subcarinate, mucronate; sepals 5, imbricate, pergamentaceous, suborbicular, unequal, 6–8 mm. long, 7–8 mm. wide, the margin entire, not glandular-denticulate; corolla 8–10 mm. long, the petals joined at base into a campanulate tube 3–4 mm. long, the 5 free petal parts obovate, 7–8 mm. wide, emarginate at the apex; stamens very numerous, over 200, about 5 mm. long, the filaments 3 mm. long, slender, joined at base into a band 2 mm. wide, which in turn is adnate to corolla, the anthers oblong-linear, 2 mm. long, the connective shortly mucous; ovary conical, 2.5 mm. long, 3 mm.

diam. at base, 2-celled, each cell 2-4 ovulate, the style 2.5 mm. long, the stigma bilobed peltate. Fruit not seen.

This is the only species of *Ternstroemia* recorded from Ecuador and the type material cited above is the only material from Ecuador examined in this study. Growing on the western slope of the Andes Mts., it is quite distinct from most other species of the genus.

The outstanding characters are the very large flowers (2 cm. across), the orbicular, eglandular and entire bracteoles and sepals, the very numerous stamens (200+) and the 2-celled ovary. Hieronymus reports the ovary cells to be 2-ovulate. In some of the specimens examined I found as many as four ovules in a single cell.

27. *Ternstroemia meridionalis* Mutis ex Linn. f., Suppl. 264. 1781. — Willdenow, Sp. Pl. 2(2): 1128. 1799. — H. B. K., Nov. Gen. et Sp. 5: 160. 1821. — Smith in Rees, Cyclop. 35: no. 1, 1817. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 14: 102 (Mém. Ternstr. 14). 1855. — Triana & Planchon in Ann. Sci. Nat. sér. 4, 17: 258. 1862. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 142. 1925. Non Swartz (1788).

Ternstroemia brevipes De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, 1: 409 (Mém. Ternstr. 17). 1822; Prodr. 1: 523. 1824. — Pro synonym.

Ternstroemia meridionalis Mutis ex Linn. f. var. *nigricans* Choisy in Mém. Soc. Phys. Hist. Nat. Genève, 14: 103 (Mém. Ternstr. 15). 1855. — Triana & Planchon in Ann. Sci. Nat. sér. 4, 17: 258. 1862.

Ternstroemia andina Wawra in Martius, Fl. Bras. 12¹: 278. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, 21: 142. 1925.

Mokofua andina (Wawra) O. Kuntze, Rev. Gen. Pl. 1: 63. 1891.

Mokofua meridionalis (Mutis ex Linn. f.) O. Kuntze, Rev. Gen. Pl. 1: 63. 1891.

Taonabo meridionalis (Mutis ex Linn. f.) Szyszylowicz in Nat. Pflanzenfam. III. 6: 189. 1893.

Taonabo andina (Wawra) Szyszylowicz in Nat. Pflanzenfam. III. 6: 189. 1893.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Cundinamarca: *J. C. Mutis* 1115 (US), 1117 (US), 2453 (ISOTYPE, US), 2475 (US), 3917 (US), 4605 (US). — Vicinity of Bogotá, between El Delirio and Guadalupe, alt. 3000 m., *J. Cuatrecasas* 5139 (US), May 28, 1939 (tree with white flowers). — Near Bogotá, Quebrado de Chicó, alt. 2800 m., *J. Cuatrecasas* 5401 (US), June 8, 1939 (tree with white flowers). — Vicinity of Bogotá, Monserrate, páramo, alt. 3000 m., *J. Cuatrecasas* 7999 (US), Jan. 28, 1940 (tree 3-4 m. with white flowers). — Near Bogotá, *Bro. Ariste-Joseph* s.n. (US) 1921. — Páramos de Bogotá, *M. T. Dawe* 148 (US), March 1916. — Río San Cristobal, near Bogotá, bushy mountain valley, alt. 3000-3300 m., *F. W. Pennell* 2046 (G, NY, US), Sept. 1917 (shrub with white flowers). — Cerro de Focha, near Bogotá, rocky open páramo, alt. 3100-3200 m., *F. W. Pennell* 2208 (G, NY, US), Sept. 1917 (shrub). Dept. Bolívar: Cordillera Occidental, below Páramo de Chaquiro, shrub zone, alt. 3000 m., *F. W. Pennell* 4371 (NY), Feb. 24, 1918 (shrub with white flowers and yellow fruit). Dept. Antioquia: Cerro de la Vieja, alt. 2700 m., *Bro. Daniel* 1692 (US), Dec. 26, 1938. Dept. Santander del Norte: Ocaño, páramos, alt. 3000 m., *L. Schlim* 439 (isotype of *T. andina*, FM), Feb. 1853 (flowers white). Without definite locality, *Purdie* s.n. (G).

Tree or shrub with terete, rugulose branches; branchlets fasciculate (4-6), terete, rugulose, glabrous, grayish. Leaves shortly petiolate (3-5 mm. long), heavy-coriaceous, oblong-obovate, 2-4(-5) cm. long, 1.5-2.0 cm. wide, obtuse at apex, emarginate, subcuneate at base, the margin revolute, usually entire, occasional signs of glandular-serrulation, the midrib canaliculate above, evident the entire length, prominent below, the veins

obscure on both surfaces. Flowers axillary, solitary; peduncles compressed, 5–10 mm. long, occasionally shorter; bracteoles 2, opposite or subopposite, unequal, variable, usually broadly ovate to suborbicular, retuse, semi-beaked at the apex, occasionally triangular, sparsely glandular-denticulate along the margin. Calyx-lobes 5, suborbicular, varying in size, the outer sepals smaller, ca. 5 mm. long and 5 mm. wide, concave, quite thick, the margin scarious, entire, with only an occasional evidence of glandular-denticulation, the inner lobes increasingly larger, up to 8 mm. long and 9 mm. wide. Petals 5–6, white, subcrassulate, ca. 12 mm. long, 10–12 mm. wide, joined for 3 mm. at base, obovate, suborbicular at apex, the margin scarious. Stamens ca. 125, seemingly bi-seriate, unequal, adnate to the base of the corolla; filaments ca. 3 mm. long, joined at base for 2 mm.; anthers oblong-linear, apiculate, ca. 3 mm. long. Ovary hemispherical or subglobose, ca. 3 mm. diam., 2-celled, each cell ca. 5-ovulate, the ovules attached at central axis; style ca. 4 mm. long and 1 mm. diam.; stigma peltate, 2-lobed, the margin crenate. Fruit subrotund-ovate, few-seeded.

Choisy (1855) designated, as distinct, the var. *nigricans* as follows: "feuilles plus évasées en haut, noircissant fortement à la surface supérieure qui est alors rude au toucher." The specimen collected by *Purdie* (*s. n.*) in Colombia was cited. A duplicate specimen found in the Gray Herbarium shows the apex of the leaf to be no wider than the apices of most specimens, the upper surface is not especially blackened and does not seem rough to the touch. Later Triana and Planchon (1862), recognized this variety and cited also *Schlim* 439, a duplicate of which also is deposited at the Gray Herbarium. Further descriptive notes concerning the pedicel, "des pédicelles comprimés et à peu près de moitié longueur de la feuille; mais ce caractère doit être variable, puisque dans la variété *nigricans* ils sont très-courts, également à peine la calice, et plutôt obscurément tetragones que comprimés" are added. The pedicel is much too variable to be used as a distinguishing character as a survey of a large number of specimens shows. Usually, the pedicel measures 8–10 mm. However, in *Mutis* 1117 and *Pennell* 4371, the measurement is 4–6 mm., in *Bro. Daniel* 1692, 3–5 mm., in *Schlim* 439, subsessile (apical) — 3 mm. (lateral). In a recent collection, *Cuatrecasas* 5401, the pedicels along the branchlets measure 9 mm. while those at the apex are subsessile. Furthermore, the 4-angled character of a subsessile pedicel which is supposedly compressed in the species is drawing too fine a point. Even the "compressed pedicel" is not a consistent character.

In 1886, Wawra described *T. andina* as new and designated *L. Schlim* 437 as the type. An examination of a photograph of the type clearly shows the number to be 439 and an annotation on the sheet says that the specimen had been cited as no. 437. Wawra's description is rather incomplete and the isotype examined lacked good flowering or fruiting material.

Two specimens, *Killip & Smith* 20626 and 20677 (AA, FM, G, NY, US), collected in Dept. Santander del Norte, have leaves which are much narrower than the specimens cited above. However, since in all other respects they agree with the characters of the species, I do not hesitate in placing them here.

28. **Ternstroemia Jelskii** (Szyszyłowicz) Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Taonabo Jelskii Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 189. 1893; in Diss. Cl. Math.-Phys. Acad. Litt. Cracov. **29**: 224. 1894.

DISTRIBUTION: Peru.

PERU: Dept. Piura, Cordillera Guamani, between Huancabamba and Ayavaca, alt. 2900–3000 m., *A. Weberbauer 6341* (FM, G, US), May 1912 (shrub 2 m. high with white flowers).—Dept. Cajamarca, Cutervo, *C. Jelski 254* (photo of TYPE, FM, G).—Dept. San Martín, near Tarapoto, *R. Spruce 4241* (G, NY, photo FM).—Dept. Huánuco, between Huánuco and Pampayacu, alt. 2700–3000 m., *R. Kanehira 68* (G), Jan. 13, 1927.—Dept. Huánuco, Panao, alt. 2750 m., *J. F. Macbride 3610* (FM, G, US), May 1923 (small shrub-tree).—Dept. Huánuco, Yanano, rocky places, alt. 1830 m., *J. F. Macbride 3777* (FM, G, US), May 1923 (shrub-tree; flowers and fruit yellow; anthers red).

According to Szyszyłowicz, this species is characterized by elliptic leaves, 3.5–4.0 cm. long, 1.5–2.0 cm. wide, shining green above, opaque below, the petiole very short. Flowers solitary, pedunculate, axillary; sepals 4–5 mm. long, rounded, broadly ovate, entire; petals orbicular; stamens 2-more-seriate, much shorter than petals, the filaments thick, the anthers oblong, minutely caudate; ovary complanate-globose, 2-celled, the style 1.5–2.0 mm. long; the stigma peltate, subbifid. Fruit ovoid, 1.2–1.4 cm. long; seeds 4, 7 mm. long.

No mention is made of the bracteoles and no measurements are given for the petioles, pedicels, petals and stamens.

All specimens cited above are poor and cannot be diagnosed with surety. They all have in common rounded calyx-lobes (*Weberbauer 6341* [4–5 mm. long], the others ca. 3 mm. long), very minute bracteoles, short petioles and pedicels. Also, all possess elliptic to obovate leaves, shining above, opaque below, ca. 4 cm. long and 2 cm. wide. The Macbride specimens are fruiting specimens and have 2-celled fruits which are four-seeded. *Weberbauer 6341* has short (0.5 mm.) sturdy pedicels, whereas all other numbers have pedicels approximately twice as long and more graceful. The type, according to Szyszyłowicz, has stamens, the filaments of which are thick. In the specimens examined, the filaments are long and slender, well exceeding the anthers in length.

29. **Ternstroemia oligostemon** Krug & Urban in Bot. Jahrb. **21**: 534. 1896. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925. — R. O. Williams, Fl. Trinidad & Tobago, **1**: 70. 1927.

DISTRIBUTION: Tobago, Trinidad.

TOBAGO: The Widow, *W. E. Broadway 4154* (FM, Mo, US), Sept. 29, 1910 (shrub with white, sweet-smelling flowers). — Easterfield, *W. E. Broadway 4369* (FM), Dec. 16, 1912 (bark of trunk rough and dark in color; leaves glossy green). — Slopes of main ridge above Parlatuvier, relict forest bordering cultivations, *N. Y. Sandwith 1916* (NY), Oct. 24, 1937 (middle-sized tree with white flowers). — Exact locality missing, *F. A. "Durity" 12620* (NY), Jan. 21, 1932.

This species is characterized by obovate or narrowly obovate-elliptic leaves, 6–10(–14) cm. long and 2.5–5.0 cm. wide, shortly or obtusely acuminate at the apex, long-attenuately tapering at the base into a petiole 8–13 mm. long, the margin subrevolute, crenulate or occasionally entire, frequently glandular, the 10–15 pairs of rather straight veins conspicuous on the lower surface, sometimes obsolete above, the texture is thick-chartaceous

and the surface is free from granular punctations. The flowers are white with a sweet odor and the pedicels measure 1.0–2.5 cm. in length. The sepals are suborbicular, 5–6 mm. long and about 5 mm. wide and like the narrowly ovate bracteoles devoid of glandular-denticulations. The petals are about 7 mm. long. The stamens (ca. 20) are about 5 mm. long, the filaments measuring only 1 mm. in length while the anthers are 4 mm. long, linear and taper gradually to the apex. The ovary is conical, 4-celled, each cell having one or two ovules, and tapering into the style which is crowned by an entire stigma slightly exceeding the style in diameter. The fruit is globose, 12–20 mm. in diameter, 4-celled with one or two seeds in each cell, only one of which usually fully matures.

One of the types of this species, as cited by Krug and Urban, is *Père Duss 171* from Martinique. Before me are several specimens of this collection (supposed isotypes, FM, Mo, NY, US) none of which belongs to this species, but to *T. elliptica*. Perhaps there may be some confusion in the label of the Berlin specimen, since all seven sheets of *Duss 171* in American herbaria are true *T. elliptica*. On the label of two specimens in the New York and U. S. National herbaria are two numbers, 171 and 638. There is no difference in the material but *Duss 638* has been cited by Urban under *T. elliptica*. I doubt very much whether *T. oligostemon* actually grows in either Martinique or Guadeloupe, from which it has been cited. Williams cites material from Trinidad (none of which I have seen), and this, with that from Tobago, perhaps gives the correct geographical distribution for the species.

Krug and Urban's description is very complete. They state, however, that the ovary and fruit are 2-celled or incompletely 4-celled and that the number of ovules and seeds in either case are four. All material sectioned by me showed the ovary and fruit to be clearly 4-celled with one or two ovules in each cell. In the first, eight seeds were found, four of which were fully mature while the other four, although immature, were of considerable size. In other cases, a single seed was found in each cell.

The distinguishing characters of *T. oligostemon* are the four-celled ovary and fruit, the eglandular sepals and bracteoles, the entire stigma and the 10–15 pairs of lateral veins of the thick-chartaceous leaves.

The closest species is *T. delicatula* of Trinidad and French Guiana. This latter species can be distinguished by the 3-celled ovary, the tri-crenate stigma, and the thin papery leaves with 7–8 pairs of lateral veins.

30. ***Ternstroemia retusifolia***, sp. nov.

Rami et ramuli verticillati, grisei, teretes. Folia crasso-coriacea, apice ramulorum verticillata vel basi ramulorum posita, cuneata, 2.5–3.0 cm. longa et 1.0–1.3 cm. lata, apice rotundata, semper retusa, basi attenuata, margine plana, basi rare revoluta, distincte crenulata, subtus punctata, costa supra canaliculata, subtus plana, saepe subimpressa, petiolis 3–5 mm. longis. Flores non visi. Fructus axillares vel apice ramulorum congesti, solitarii, globosi vel subglobosi, ca. 1 cm. longi et 0.9 cm. diam., 2-loculati, loculis 3-seminibus; pedicellis 1.5–2.0 cm. longis; bracteolis 2 vel 4 (raro 3), binis exterioribus inter se oppositis, minimis ovatis 3–4 mm. longis et ca., 5 mm. latis, margine glanduloso-denticulatis, binis interioribus inter

se oppositis, cum exterioribus alternis, longo-ovatis, 6–7 mm. longis et 3.5–4.0 mm. latis, margine distincte glanduloso-denticulatis; sepalis 5, imbricatis longo-ovatis 9–10 mm. longis et 5.0–6.5 mm. latis, apice acuminate, margine scariosis integerrimis; petalis (ex corollae fragmento) longo-acuminatis, ca. 6 mm. longis et 2 mm. latis; stylo persistente 5–6 mm. longo; seminibus ca. 5–6 mm. longis.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Auyantepui (Guayana), *F. Cardona* 243 (TYPE, US), Sept. 1937.

Although described from a fruiting specimen, this species presents several outstanding and unusual delimiting characters. The leaves are thick-coriaceous, cuneate, always retuse at the apex, with a distinct crenulate margin, and are punctate on the lower surface. Two pairs of bracteoles are often found on the fruiting pedicel. The outer pair, which is always present, is the smaller. The inner pair, alternating with the outer, is somewhat sepaloid and might be interpreted as extra sepals. Occasionally a single bracteole or sepal, according to one's interpretation, is found instead of the inner pair. The sepals are only sparsely glandular-denticulate.

An annotation on the type sheet intimates that *Cardona* 245, collected at the same locality, is the same as this species. This specimen, which has not been examined in this study, is to be found in "Herb. Venezuela" at Caracas.

31. ***Ternstroemia pungens*** Gleason in Bull. Torrey Bot. Club, **58**: 400. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida: Savanna Hills, dry slopes, alt. 1300 m., *G. H. H. Tate* 837 (TYPE, NY) Aug. 1928 – Apr. 1939 (bush). — Between ridges 23B and 23C, alt. 1850 m., *G. H. H. Tate* 696 (NY, US), Aug. 1928 – Apr. 1939 (large bush; fruit red).

Shrubs with gray, terete, striate branchlets. Leaves coriaceous, obovate to oblong-obovate, up to 5.5 cm. long and 3 cm. wide, rounded and retuse at the apex, cuneate at the base, the margin subentire or finely crenulate especially near the apex, often revolute, upper surface bright green, with impressed midrib and obscure lateral veins, lower surface reddish, profusely black-punctate, the petiole 3–4 mm. long. Fruit borne on long slender recurved pedicels up to 3 cm. long, subglobose, ca. 1 cm. diam., 2-celled, 4–6-seeded, the seeds small, black, ca. 4–5 mm. long, the persistent style 6–7 mm. long, clearly two parted. Fruiting calyx persistent, long-ovate, sharp pointed, involute, 13–15 mm. long, ca. 5 mm. wide at base, the outer lobes glandular-denticulate. The bracteoles appear deciduous or perhaps have been broken off.

The broad obovate leaves, with petioles 3–4 mm. long and profusely black-punctate on the lower surface, are the characters that distinguish this species from *T. tristyla*. On one fruit capsule examined were present a long persistent style, 2-parted as in *T. tristyla*, and fragments of petals showing these two species to be most closely associated.

32. ***Ternstroemia dura*** Gleason in Bull. Torrey Bot. Club, **58**: 401. 1931.

DISTRIBUTION: Venezuela.

VENEZUELA: Mount Duida: Brocchinia Hills, alt. 1350 m., *G. H. H. Tate* 1017 (TYPE, NY), Jan. 4, 1929. — Summit of Peak No. 7, first ridge, alt. 2150 m., *G. H. H. Tate* 656 (NY), Aug. 1928 – April 1929.

Shrub with subverticillate, fissured branchlets. Leaves thick-coriaceous,

elliptic-oblong, up to 3 cm. long, 1.2 cm. wide, obtuse and slightly retuse at apex, tapering at base, the margin revolute, the whole leaf revolute to the midrib and veins invisible, the petiole 1–2 mm. long. Fruit solitary, axillary, the pedicels stout, up to 3 cm. long. Bracteoles 2, opposite, unequal, broadly ovate, 2–3 mm. long, 1.5–2.5 mm. wide, the margin entire with only occasional glandular-denticulations. Calyx-lobes ovate, 8–10 mm. long, 4–5 mm. wide, minutely apiculate, the outer lobes glandular-denticulate along the margin, the inner lobes scarious-margined. Capsule conical-ovoid, ca. 1.5 cm. long, 2-celled, ca. 4-seeded, the seeds light colored, 6–7 mm. long, the persistent style entire, 9 mm. long, the stigma punctiform.

The outstanding characters of this species are the heavy-coriaceous leaves, revolute to the center, the unequal, broadly ovate bracteoles, the minutely apiculate sepals, the 2-celled ovary, the long (9 mm.) style and the punctiform stigma.

33. **Ternstroemia oleaefolia** Wawra in Martius, Fl. Bras. **12**¹: 279. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Mokofua oleaefolia (Wawra) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo oleaefolia (Wawra) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: Brazil.

No specimens examined.

Branchlets graceful, subverticillate or dichotomous, grayish, many-leaved. Leaves often 3–5-pseudoverticillate, firm, cuneate-oblong or cuneate-obovate, 3–4 cm. long, 0.5–1.0 cm. wide, obtuse or rounded at apex, very short apiculate, attenuate at base, margin recurved, entire or obsolete crenulate at apex, concolorous or fuscous and sparsely punctate below, veins obsolete, the petiole 5 mm. long. Flowers few, the pedicels 2 cm. or longer, filiform, subcompressed; bracteoles ovate, 5 mm. long, cuspidate-acuminate; calyx-lobes unequal, ca. 1 cm. long, very acute, margin of outer lobes glandular-denticulate, inner lobes erose; petals connate below, connivent, oblong-lanceolate, somewhat longer than the calyx, the margin crisp; stamens uniseriate, not more than 20, half as long as the petals, the filaments very short, compressed, the anthers subsaggitate, somewhat cuspidate; ovary globose, compressed, 2-celled with indications of spurious septa, 2–3 ovules in each cell, the style filiform, strict, over 1 cm. long, the stigma minute, punctiform, under lens bi-lobed.

Although no material was examined, the species presents characters which separate it from closely allied species. These are (1) the subverticillate branchlets with many small, cuneate, 3–5-pseudoverticillate leaves; (2) the compressed, filiform pedicels; (3) the long (1 cm.) very acute, glandular-denticulate sepals; (4) the stamens uni-seriate, about 20 in number, and (5) the long, filiform style (over 1 cm. long), the minute bi-lobed, punctiform, stigma and the 2-celled ovary.

34. **Ternstroemia dentata** (Aublet) Swartz, Prodr. Veg. Ind. Occ. 81. 1788. — Willdenow, Sp. Pl. **2**³: 1129. 1799. — Smith in Rees, Cyclop. **35**: No. 5. 1817. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 410 (Mém. Ternstr. 18). 1822; Prodr. **1**: 524. 1824. — Sprengel, Syst. Veg. **2**: 595. 1825. — Spach, Hist. Nat. Veg. **4**: 62. 1835. — Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Wawra in Martius, Fl. Bras. **12**¹: 278. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Taonabo dentata Aublet, Pl. Guian. **1**: 569. 1775; **4**: t. 227. 1775. — Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

Ternstroemia multiflora Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18) 1855.

Ternstroemia dentata Swartz var. α . *multiflora* Choisy, loc. cit.

Ternstroemia dentata Swartz var. γ . *oblongifolia* Choisy, loc. cit.

Ternstroemia dentata Swartz var. α . *opaca* Wawra in Martius, Fl. Bras. **12**¹: 279. 1886.

Ternstroemia dentata Swartz. var. β . *latifolia* Wawra, loc. cit.

Mokofua dentata (Aublet) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

DISTRIBUTION: Brazil, French Guiana.

BRAZIL: Prov. Rio Negro, near Barra, *R. Spruce 1045* (ISOTYPE of *Ternstr. dentata* var. *latifolia*, NY; photo FM, G), Dec. 1850 – Mar. 1851. — Prov. Para, near Santarem, *R. Spruce 1083* (NY; photo G), Sept. 1850. — Prov. Rio Negro, near Barra, *R. Spruce 1302* (G, NY; photo FM), May 1851. — Prov. Para, near Santarem, *R. Spruce s.n.* (ISOTYPE of *Ternstr. multiflora*, FM, G), Sept. 1850. — *M. Poeppig s.n.* (ISOTYPE of *Ternstr. dentata* var. *oblongifolia*, fragm. FM), 1834. — Amazonas, Ega, margin of forests, *M. Poeppig 2667* (ISOTYPE of *Ternstr. dentata* var. *oblongifolia*, FM, and ISOTYPE of *Ternstr. dentata* var. *opaca*, FM). — State of Amazonas, Municipality Humayta, near Livramento on Rio Livramento, on terra firma, *B. A. Krukoff 6779* (AA, FM, NY, US), Oct.–Nov. 1934 (tree 70 ft. with rose flowers). — State of Amazonas, Municipality Humayta, on plateau between Rio Livramento and Rio Ipixuma, on campinarana alta, *B. A. Krukoff 7087, 7287* (AA, FM, NY, US), Nov. 1934 (tree 65 ft.). — State of Amazonas, Municipality Manaus, along road to Aleixo, high forest, terra firma, *B. A. Krukoff 8036* (AA, FM, NY), Aug.–Sept. 1936 (low tree or shrub). FRENCH GUIANA: Without definite locality, *Leprieur, s.n.* (fragm. FM).

Trees or shrubs. Leaves coriaceous, obovate to elliptic-obovate, 6–13 cm. long, 2–6(–7) cm. wide, obtusely acuminate at apex, cuneate at base, the margin serrate, 8–12 pairs of veins generally evident on both surfaces, sparsely dark-punctate on the undersurface, the petiole 0.7–1.0 cm. long (2 cm. in *Spruce 1045*). Flowers axillary, usually solitary, occasionally 2-fasciculate. Pedicel 1.5–2.5 cm. long, subterete. Bracteoles 2, unequal, long-triangular, ca. 2 mm. long, sparsely glandular-denticulate. Calyxlobes 5, imbricate, pergamentaceous, 7–8 mm. long, unequal, the outer lobe ca. 5 mm. wide, ovate, glandular-denticulate, the inner lobe ca. 6.5 mm. wide, obovate, the margin scarious. Petals 5, imbricate, pink or rose, oblong-ovate, ca. 8 mm. long, 4 mm. wide, membranaceous, the margin scarious. Stamens bi-seriate, ca. 35, joined their entire length; filaments ca. 1.5 mm. long; anthers long-tapering, unequal, apiculate, 4.0–4.5 mm. long. Ovary conical, two- or four-celled (occasionally incompletely four-celled), four-ovulate, tapering through style (2.5–3.0 mm. long) into a punctiform stigma. Fruit subglobose, ca. 1 cm. diam., two- or four-celled, four-seeded, each seed ca. 7 mm. long.

The most distinctive features of this species are the dentate leaves, the two- or four-celled ovary and fruit, and the long apiculate stamens with apicules nearly 2 mm. long.

Choisy (1855) recognized three varieties, namely var. *multiflora*, var. *oblongifolia* and var. *nudiflora*. Wawra (1886) suggested two new varieties, namely var. *latifolia* and var. *opaca*. Of these, var. *nudiflora* was raised by Urban to specific rank. Varieties *multiflora*, *oblongifolia* and *opaca* present no differences to warrant consideration.

Wawra's var. *latifolia* is indeed a wide-leafed specimen and when he prepared his treatment *Spruce 1045* probably was worthy of distinction. How-

ever, with more ample material available, the larger leaves of *Spruce 1045* (7 cm. wide) are less than a single centimeter wider than the larger leaves of *Krukoff 7287*, which, in turn, has also the smaller leaves typical of the species.

35. ***Ternstroemia brachypoda*** (Wawra), comb. nov.

Ternstroemia Pavoniana? Moricand var. *brachypoda* Wawra in Martius, Fl. Bras. **12**¹: 278. 1886.

DISTRIBUTION: Peru.

PERU: Tatamara, *Lechler 2613* (photo and fragment of TYPE, FM, G).

Branchlets verticillate, angled or striate. Leaves membranaceous or chartaceous, oblong-obovate, 2.5–3.0 cm. long and 1.0–1.5 cm. wide, obtuse and retuse at apex, attenuate at base, the margin denticulate, plane or slightly revolute, the midrib impressed above, elevated below, the veins obscure above, 4–5 pairs elevated below, reticulate, the petiole 3–5 mm. long. Flowers small, solitary with short pedicels; bracteoles ovate, glandular-denticulate; sepals 5, orbicular, glandular-denticulate, hardly exceeding the obovate petals; stamens very small, clavate, the anthers obovoid, mucous, attenuated into slender filaments; ovary 2-celled, each cell 2-seeded; style thick short, the stigma punctiform.

This species was described originally by Wawra as a dubious variety of *T. Pavoniana* Moricand (= *T. quinquepartita* R. & P.). Although only leaf-fragments and a photograph of the type are available for the study of this species, it is clear that it deserves specific status and that the relationship with *T. quinquepartita* is quite superficial. Both have small leaves and flowers. However, in *T. brachypoda* the leaves are more obovate and membranaceous, with veins raised and reticulate on the lower surface, not evident on the upper surface. In *T. quinquepartita* the leaves are more suborbicular and heavy-coriaceous, with the veins deeply etched on the upper surface and raised on the lower surface. The pedicels in *T. quinquepartita* are 2.0–2.5 cm. long, whereas in *T. brachypoda* they are described by Wawra as “brevissime pedunculatis.” Detailed descriptive characters and measurements, for the most part, were overlooked by Wawra.

36. ***Ternstroemia laevigata*** Wawra in Martius, Fl. Bras. **12**¹: 281. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Mokofua laevigata (Wawra) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Roraima, *R. Schomburgk 573* (ISOTYPE, FM).

Branches terete, smooth, gray. Leaves coriaceous, oblong-obovate, 5–8 cm. long, 2–3 cm. wide, pale green above, reddish below, veins hardly visible above, both surfaces smooth and free from any punctations, the margin subrevolute, denticulate, the petiole ca. 1 cm. long. Flowers few, the peduncles 1.5–3.0 cm. long; bracteoles acuminate, glandular-denticulate; calyx-lobes subequal, rounded, ca. 5–6 mm. long; glandular-denticulate; petals connate below, shorter than the calyx-lobes, oblong connivent and crisp at the apex; stamens included, 2-seriate, adnate to base of corolla, equalling corolla in length, the filaments very wide, the anthers linear; ovary globose, striate, bi-locular, cells 2-seeded or if 4-celled, one-seeded; style filiform equalling the calyx in length; stigma very minute, punctiform, bisulcate.

Only a leaf-specimen was available for study. The statistics concerning the flower were taken from Wawra's description. Szyszyłowicz treated this species as a synonym of *T. Schomburgkiana*, evidently not taking into consideration the differences in ovary characters and leaf shape and texture.

37. ***Ternstroemia polyandra***, sp. nov.

Arbor parva, ca. 3 m. alta, ramulis griseis teretibus. Folia coriacea, oblongo-obovata vel oblongo-elliptica, 7–12 cm. longa et 3–4 cm. lata, apice obtusa rare rotundata, basi cuneata, subtus brunneo-punctata, margine subrevoluta, denticulata, costa supra canaliculata, subtus elevata, venis (8–10 paribus) secundariisque undique elevatis reticulatisque, petiolis ca. 1 cm. vel plus longis. Flores axillares, solitarii, apice ramulorum congesti, pedicellis teretibus circiter 1.5 cm. longis, bracteolis 2 oppositis late ovato-triangularibus crassis circa 3 mm. longis et 2.5–3.0 mm. latis, margine glanduloso-denticulatis, apice subapiculatis; sepala 5, imbricata, orbicularia vel suborbicularia, 6–7 mm. longa et 6.0–7.5 mm. lata, exterioribus margine glanduloso-denticulatis, interioribus margine scariosis integerrimis; petala 5, suborbicularia, circiter 6–7 mm. longa et 7–8 mm. lata, emarginata, basi 2 mm. connata; stamina plurima, circiter 300, 4-seriata (ut videtur), 2–4 mm. longa (eodem flore), filamentis gracilibus 1.0–2.5 mm. longis (eodem flore), antheris linearibus 1.0–1.5 mm. longis, connectivo plano, non mutico; ovarium late conicum, circiter 2 mm. longum et 2 mm. diametro, 2-loculatum, loculis 3-ovulatis, stylo parvo 2 mm. longo, stigmate punctiformi bi-lobato. Fructus semi-globosus, circiter 1.2 cm. longus et 1 cm. diametro, 2-loculatus, seminibus 4, circiter 5 mm. longis.

DISTRIBUTION: Bolivia.

BOLIVIA: Santa Barbara, alt. 1500 m., *R. S. Williams 1565* (TYPE, NY), Aug. 30, 1902 (8 ft. high, 2 in. diam.). — Same locality, *R. S. Williams 1565A* (NY). — Hacienda Simaco, on the road to Tipuani, alt. 1400 m., *O. Buchtien 5468* (NY, US), Feb. 1920.

As the name signifies, this species is characterized by many stamens, 300 or more, 4-seriate. Also, the oblong-obovate leaves, dark-punctate below and conspicuously veined in both surfaces, are conspicuous characters. *Buchtien 5468* does not show this veining as conspicuously as the type.

Cited here also might be *Bang 2360*. This fruiting specimen agrees in most characters with the type. However, the leaves have a very smooth texture, unusual in the specimens studied, and lack the dark-punctate dots on the lower surface.

38. ***Ternstroemia verticillata*** Klotzsch ex Wawra in Martius, Fl. Bras. **12**¹: 272.

1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Ternstroemia verticillata Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092.

1848. — Nomen nudum.

Mokofua verticillata (Klotzsch) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo verticillata (Klotzsch) Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Along banks of Courantyn River, *R. Schomburgk 1566* (TYPE; photo. G, FM), July-Oct. 1843. — Kaieteur Savannah, in thickets on rocky ground, alt. 360 m., *N. Y. Sandwith 1295* (NY), Sept. 2, 1937 (small tree; flowers sweet-scented, petals yellow, sepals white with deep red center).

Branchlets 5–6-verticillate. Leaves coriaceous, obovate to cuneate-oblong, 2–4 cm. long, 1–2 cm. wide, often 3–5-verticillate, truncate to retuse at apex, pale green, opaque above, fuscous, granular-punctate below, veins

inconspicuous, the margin glandular-crenulate near apex, subsessile or with petiole up to 5 mm. long. Flowers axillary, solitary, the pedicel ca. 1 cm. long, graceful; bracteoles 2, ovate-oblong, 2–3 mm. long, glandular-denticulate; calyx-lobes 5, ovate, submembranaceous, not pergamentaceous, 5–6 mm. long, the margin subscarious yet glandular-denticulate; corolla 7 mm. long, the 5 petals coalesced 5 mm., free portions 2 mm. long, ovate-lanceolate; stamens few, ca. 25, uni-seriate, 4–5 mm. long, the filaments 1–2 mm. long, some filiform, others thick, the anthers linear, acuminate, 2.5–3.0 mm. long; ovary conical, 1.5 mm. diam. at base, tapering into style 4 mm. long, 2-celled, each cell 2-ovulate, sometimes incompletely 4-celled, then each cell 1-ovulate, the stigma punctiform, bi-lobed.

The outstanding characters of this species are: (1) branchlets and sometimes leaves verticillate; (2) leaves truncate or retuse at apex; (3) submembranaceous, colored calyx-lobes which are glandular-denticulate; (4) the corolla coalesced for over two-thirds its entire length; (5) the uni-seriate (25) stamens.

The coalesced corolla separates the species from all others studied. Nearest is *T. globiflora* which is more nearly gamopetalous, having only minute lobes at apex. In *T. verticillata*, the corolla is globose at the base, tapering toward apex where the petals become free.

39. ***Ternstroemia Klugiana***, sp. nov.

Arbor 8–15 metralis, ramulis teretis verticillatis. Folia coriacea, oblongo-obovata, 6–8 cm. longa, 2.5–3.5 cm. lata, apice obovata, subite acuminata, basi longe attenuata, supra nitida, subtus opaca, costa supra canaliculata apice evanida, subtus prominente elevata, venis 15 vel plus paribus supra haud manifestis, subtus obscuris, margine integerrima, plana vel sub-revoluta, petiolis ca. 1 cm. longis. Flores solitarii, pedicellis circiter 9 mm. longis, bracteolis 2 oppositis ovatis circiter 2 mm. longis et 1.0–1.5 mm. latis acuminatis subcarinatis, margine paucissime (1–3) glanduloso-denticulatis; sepala 5, imbricata, 3.5–4.0 mm. longa, exterioribus ovatis circiter 2 mm. latis, apice subacutis, margine paucissime (1–3) glanduloso-denticulatis in sicco revolutis, interioribus late ellipticis vel obovatis, 2.5–3.0 mm. longis, apice obtusis, margine scariosis, non glanduloso-denticulatis; petala 5, membranacea, obtusa, circiter 5.5 mm. longa, 2–3 mm. lata, basi 3 mm. connata; stamina circiter 25, uni-seriata, 3–4 mm. longa, apiculata, filamentis compressis, circiter 0.5 mm. longis, connatis, ad basim corollae adnatis, antheris oblongo-linearibus, circiter 2 mm. longis, apiculis 1 mm. vel plus longis; ovarium conicum, basi 1 mm. vel plus diam., 2-loculatum, loculis uno-ovulatis, stylo 2.5–3.0 mm. longo, stigmatibus punctiformi. Fructus conicus, aureus (fide coll.), circiter 7 mm. longus, basi 6 mm. diam., apice 1 mm. diam. Semina non visa.

DISTRIBUTION: Peru.

PERU: Dept. Loreto, Mishuyacu, in forest near Iquitos, alt. 100 m., *G. Klug 64* (TYPE, NY), Oct.–Nov. 1929 (tree 8 m. high; flowers white). — Same locality, *G. Klug 1561* (NY), May–June 1930 (tree 15 m. high; fruit orange).

The outstanding and distinguishing characters of this species are (1) the obovate, coriaceous, abruptly acuminate leaves with 15 or more pairs of obscure, rather straight veins; (2) the short (9 mm.) erect pedicels; (3) the revolute acute outer calyx-lobes (3.5–4.0 mm. long), very sparingly

glandular-denticulate; (4) the petals connate for two-thirds their length; (5) the uni-seriate stamens with apicules longer (1 mm.) than the compressed filaments; (6) the 2-celled ovary and small, punctiform stigma; (7) the distinctly conical fruit.

40. **Ternstroemia carnosa** Cambessèdes in A. St. Hilaire, Fl. Bras. Mer. **1**: 299. 1827. — Walpers, Repert. Bot. Syst. **1**: 369. 1842. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 102 (Mém. Ternstr. 14). 1855. — Wawra in Martius, Fl. Bras. **12**¹: 276. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.
Ternstroemia carnosa Cambessèdes var. *acutifolia* Wawra in Martius, Fl. Bras. **12**¹: 276. 1886.
Mokofua carnosa (Cambessèdes) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.
Taonabo carnosa (Cambessèdes) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 188. 1893.

DISTRIBUTION: Brazil.

BRAZIL: State of Minas Geraës, near Palmita, A. St. Hilaire s.n. (TYPE; photo and fragment, FM). — State of São Paulo, in swamps, Martius s.n. (TYPE of *T. carnosa* var. *acutifolia*; photo, FM, G). — State of Goyaz, Santa Luzia, Serra do Cipó, stony field, M. Barreto 4509 (FM), Aug. 17, 1936 (tree 2 m., rare).

According to Wawra, the principal characters of this species are: Leaves coriaceous, 3–6 cm. long, oblong, rounded at apex, rarely shortly acuminate, the margin revolute, entire or obsolete crenulate, the petiole short, ca. 3 mm. long. Peduncles 1.0–1.5 cm. long, terete, the bracteoles coriaceous, ovate, 4 mm. long, suborbicular, the margin sometimes glandular-denticulate. Sepals 7–10 mm. long, subequal, obovate or suborbicular, the outer lobes glandular-denticulate, the inner lobes entire. Petals exceeding the calyx in length, ovate, joined at the base. Stamens bi-seriate, shorter than the petals, the filaments compressed, very short, the anthers linear, long-mucronate. Ovary globose, 2- or 4-celled, the cells 3–4-ovulate, the style thick, equalling the stamens in length, the stigma punctiform, sub-bi-lobed.

Complete material of this species and *T. cuneifolia* have not been available for this study. I am very dubious of the status of the latter as a species. Wawra, in Martius, Fl. Bras., says that the stigma is punctiform, that the petals exceed the calyx-lobes (7–10 mm. long) in length and that the anthers are long-mucronate.

41. **Ternstroemia asymmetrica** Rusby in Bull. N. Y. Bot. Gard. **4**: 327. 1907.
Mokofua Lorentzii Hieronymus ex O. Kuntze, Rev. Gen. Pl. **3**²: 17. 1898. Nomen nudum.
Taonabo flavifolia Rusby in Bull. N. Y. Bot. Gard. **8**: 104. 1912. Syn. Nov.

DISTRIBUTION: Bolivia.

BOLIVIA: A. M. Bang 1974 (TYPE, NY). — Songa, A. M. Bang 837, 838 (FM, G, Mo, NY, US), Nov. 1890. — Atten, alt. 1500 m., R. S. Williams 1452 (TYPE of *T. flavifolia*, NY), Aug. 17, 1902 (tree 20 ft. high, 6 in. diam.). — Huaynachorisa, alt. 1100 m., R. S. Williams 1538 (NY, US), July 26, 1902 (tree 25 ft. high). — Buyuyu, P. Lorentz & G. Hieronymus 869 (FM, NY, photo G). — Dept. La Paz, Prov. Larecaja, Copacabana (about 10 km. s. of Mapiri), alt. 850–950 m., B. A. Krukoff 11011, 11212 (AA, NY), Oct.–Nov. 1939 (tree 60 ft.)

Tree up to 60 ft. with grayish branches. Leaves coriaceous, oblanceolate to obovate, 3–9 cm. long, 2–3 cm. wide, sometimes inequilateral, slightly blunted or acuminate at the apex, tapering at the base into a petiole, the midrib canaliculate above, prominent below, the veins (10–12 pairs) somewhat prominent above, inconspicuous below, the margin entire or nearly so, the petiole ca. 1 cm. long. Flowers solitary, the pedicels ca. 1 cm. long;

bracteoles 2, opposite, very minute, ovate-triangular, ca. 1 mm. long, apiculate, glandular-denticulate; calyx-lobes orbicular or suborbicular, unequal, concave, pergamentaceous, 4–5 mm. long and 4–5 mm. wide, the outer lobes glandular-denticulate; petals obovate, 7–8 mm. long, 6–7 mm. wide, emarginate at the apex; stamens ca. 40, 5 mm. long, the filaments slender 3 mm. long, joined at base and adnate to base of corolla, the anthers linear, ca. 2 mm. long, the connective hardly muticous; ovary ovate-conical, ca. 2 mm. long and 2 mm. diam. at base, 2-celled, each cell 2–3-ovulate, the style 2.5 mm. long, the stigma punctiform, bi-lobed. Fruit globose, ca. 8–9 mm. diam.; seeds 2 or more, ca. 5–6 mm. long.

In the original description of this species, Rusby concentrates on branchlets and leaves, devoting little consideration to flowers, especially floral measurements and ovary characters, thus handicapping workers who have lacked access to the types. The species is based, so it seems, on the asymmetrical leaves. This character, even in the type, is not very prominent; in fact, some of the specimens cited above hardly exhibit such leaves. Later, Rusby described *T. flavifolia*. I can see no true characters separating this second species from *T. asymmetrica*. It is merely a fruiting specimen of the original species.

The outstanding characters of *T. asymmetrica* are the very small floral and fruiting parts. The calyx-lobes measure not more than 5 mm. in length and the bracteoles are correspondingly small, measuring only a single mm. Both are glandular-denticulate. The ovary is 2-celled and the fruit small, globose and few-seeded.

Other specimens, with slight variations, which perhaps should be cited here are *B. A. Krukoff 11006* and *11288* collected at Copacabana (about 10 km. south of Mapiri). These two specimens have wider leaves and slightly larger flowers. Number *11288* has been identified with *T. congestiflora*. In fact, many specimens of *Ternstroemia* in Bolivia have been identified with *T. congestiflora* from Colombia. The Colombian species is very distinct, having much heavier coriaceous leaves, obtuse at both extremities, with veins conspicuous on the under surface. Another specimen, *Steinbach 6057*, probably belongs here. This last specimen has smaller leaves which are quite regularly elliptic.

42. ***Ternstroemia clusiaefolia*** Humboldt, Bonpland & Kunth, Nov. Gen. Sp. **5**: 161, t. 463, fig. 1, 1821. — Sprengel, Syst. Veg. **2**: 595. 1825. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 103 Mém. Ternstr. 15). 1855. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Mokofua clusiaefolia (H. B. K.) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo clusiaefolia (H. B. K.) Szyszylowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Cauca, Popayan, between Hacienda de Meneses and Pasto, alt. ca. 2400 m., *A. Bonpland 2152* (photo of TYPE, FM). — Dept. Santander, forest on mountains east of Las Vegas, alt. 3000–3300 m., *E. P. Killip & A. C. Smith 15866* (AA, G, NY, US), Dec. 1926 (tree). — Dept. Santander, forests in vicinity of Charta, alt. 2000–2600 m., *E. P. Killip & A. C. Smith 18902* (AA, FM, G, NY, US), Feb. 1927 (tree 10–12 ft.; fruit green, lustrous).

Tree 25–35 ft. Branchlets subverticillate. Leaves oblong-obovate, 6–8 cm. long, 3.0–3.5 cm. wide, coriaceous, obtuse at apex, tapering at base,

midrib canaliculate above, prominent below, venation invisible, dark-punctate below, the margin entire, plane, the petiole 0.7–1.0 cm. long. Flowers (*Killip & Smith 15866*) described below. Fruit ovate-subglobose, ca. 10 mm. long and 7 mm. wide, 2-celled, the pedicel ca. 2 cm. long, the calyx-lobes suborbicular, the outer lobes 7 mm. long, 5 mm. wide, the inner lobes 1 cm. long, 7 mm. wide.

Flowers (*Killip & Smith*) axillary, solitary, the pedicels 1.2–1.5 cm. long; bracteoles minute ca. 2 mm. long, somewhat glandular; calyx-lobes suborbicular, 5–6 cm. long, outer lobes fimbriate, occasionally glandular, inner lobes scarious-margined; petals 5, free nearly to base, obovate, ca. 5.5 mm. long and 3.5 mm. wide; stamens bi- or tri-seriate, nearly 100, 3–4 mm. long, the filaments filiform, ca. 1.5 mm. long, joined at the base, the anthers oblong-linear, ca. 2.5 mm. long, subapiculate; ovary minute, 2-celled, few-ovulate, the style 2+ mm. long, longer than the ovary, the stigma punctiform, bi-lobed, swelling slightly.

The type of this species, of which only a photograph has been available for this study, is a fruiting specimen. Dr. A. C. Smith compared *Killip & Smith 15866*, a flowering specimen, with the type in Paris and reported that the two matched perfectly. The above description of the flower was drawn from this number.

The margin of the fruiting calyx-lobes in the type is described as membranaceous. In *Killip & Smith 15866*, the calyx-lobes (flowering) are somewhat smaller and the margin is quite membranaceous but also fimbriate with an occasional evidence of glandular-denticulations. The leaves of the two specimens match very well.

43. ***Ternstroemia longipes*** Klotzsch ex Wawra in Martius, Fl. Bras. **12**¹: 277. 1886.

— Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Ternstroemia longipes Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848.

— Nomen nudum.

Mokofua longipes (Klotzsch) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo longipes (Klotzsch) Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: *R. Schomburgk 1103* (TYPE; photo, FM, G), Dec. 1842.

Originally published by Klotzsch as a nomen nudum, this species was later described by Wawra in Martius, Fl. Bras. Only a photograph of the type was available for study. Except for a few measurements and general observations most of the following data were obtained from Wawra's description. Incidentally, the photo of the type shows only one mature leaf and one flower.

The leaves are described by Wawra as submembranaceous, elliptic, 4–6 cm. long, 1–2 cm. wide, acute at both extremes, the margin undulate, somewhat glandular-crenulate, the veins obscure, the petiole ca. 1 cm. long. The flowers, according to Wawra, are few, solitary, internodal [most unusual, if true]; pedicel slender, ca. 4 cm. long; bracteoles [2] ovate or oblong, 2 mm. long, glandular-denticulate, glandular-apiculate; sepals [5] subequal, 5 mm. long, orbicular, the outer lobes glandular-denticulate; petals broadly obovate, equalling the calyx in length, subentire; stamens bi-seriate, shorter than petals, the filaments (in same flower, unequal) filiform or very short and thick, the anthers linear, subsagittate, laterally dehiscent, subulate, apiculate; ovary ovoid-globose, two-celled, cells bi-

ovulate, the style terete, thick, shorter than the ovary, the stigma deeply bisulcate or divided into two substipitate, orbicular stigmas.

The outstanding characteristics seem to be the elliptic submembranaceous leaves, the internodal flowers, the long pedicel, the laterally dehiscent anthers and the very short style.

44. ***Ternstroemia crassifolia*** Benth in Hooker, London Jour. Bot. **2**: 363. 1843. — Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Wawra in Martius, Fl. Bras. **12**¹: 276. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Ternstroemia suborbicularis Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. — Nomen nudum.

Ternstroemia crassifolia Benth var. *suborbicularis* (Klotzsch) Wawra in Martius, Fl. Bras. **12**¹: 277. 1886.

Mokofua crassifolia (Benth) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo crassifolia (Benth) Szyszlowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: British Guiana.

BRITISH GUIANA: Roraima, *R. Schomburgk* 602 (probable ISOTYPE, FM).

Leaves obovate, coriaceous, obtuse to rounded at the apex, cuneate at the base, 4–6 cm. long, 1.5–3.0 cm. wide, the margin subrevolute, lightly denticulate at the apex, the veins, except for midrib, obscure, the petiole 0.8–1.0 cm. long. Flowers axillary, solitary, or few-fasciculate at end of branchlets; pedicel ca. 6 mm. long; bracteoles 2, suborbicular, ca. 1.5 mm. long; calyx-lobes 5, imbricate, suborbicular, small, 2.5–3.5 mm. long, ca. 2.5 mm. wide, outer lobes glandular-denticulate; petals 5, imbricate, joined at base, 4–5 mm. long, rounded at apex; stamens seemingly bi-seriate, ca. 4 mm. long, the filaments and anthers both very narrowly linear and both ca. 2 mm. long, the anthers acuminate at apex; ovary (fide Wawra) 2-celled, each cell 2- or 1-ovulate, the style shorter than the ovary, the stigma discoid, bi-lobed.

The leaves of this species are not as thick as the name would indicate, when all other species are taken into consideration. The closest relative seems to be *T. discoidea* Gleason, which has a 3-celled ovary and a tri-crenate stigma. Otherwise, they agree very well. Only a leaf-specimen and fragmentary flowers of the specimen cited above were available for study. The observation that the ovary is 2-celled and the stigma discoid and bi-lobate is based on Wawra's description. Benth, in the original description, failed to mention the ovary, style, stigma or fruit, the description, in fact, being rather general.

45. ***Ternstroemia quinquepartita*** Ruiz & Pavon, Syst. Veg. Flor. Peruv. Chil. 180. 1798. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 411 (Mém. Ternstr. 19). 1822; Prodr. **1**: 524. 1824.

Ternstroemia Pavoniana Moricand in Mém. Soc. Phys. Hist. Nat. Genève, **7**: 258 (Pl. Nouv. D'Amér. 18), t. 13. 1836. — Walpers, Repert. Bot. Syst. **1**: 369. 1842. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 102 (Mém. Ternstr. 14). 1855. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Taonabo Pavoniana (Moricand) Szyszlowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

Ternstroemia pentapetala Pavon, in herb. — Moricand (1836) and Choisy (1855) in Synon. — Non Jack, 1820.

DISTRIBUTION: Peru.

PERU: In Andium sylvaticis et frigidis versus Pallao vicum, *J. Pavon s.n.* (TYPE, Madrid; ISOTYPE & photo, FM).—Locality not given, probably same as above, *J. Pavon s.n.* (TYPE of *T. Pavoniana*, Genève; photo & fragment, FM).

Leaves heavy-coriaceous, oblong-obovate, ca. 2.5 cm. long, 1.0–1.2 cm. wide, rounded, emarginate at apex, cuneate at base, 3–4 pairs of veins deeply etched on the upper surface, obscure below, the cross-veins equally impressed above, the margin revolute, obscurely serrulate, the petiole up to 3 mm. long. Flowers axillary, solitary. Pedicels 2.0–2.5 cm. long, the bracteoles 2, opposite, ovate-lanceolate, ca. 3 mm. long, carinate, the margin glandular-denticulate. Calyx-lobes 5, imbricate, suborbicular, 5–6 mm. long, ca. 4 mm. wide, pergamentaceous, concave, the outer lobes glandular-denticulate. Petals 5, imbricate, joined lightly at the base, obovate, ca. 5–6 mm. long, ca. 5 mm. wide. Stamens (fide Moricand) ca. 100, in several series, ca. 3 mm. long, attached to the base of the petals, the filaments slender, 2 mm. long, joined firmly together at the base, the anthers oblong, shortly mucronate, 1 mm. long. Ovary minute, subconical, ca. 1 mm.⁺ long, 2-celled, 3–4 ovules in each cell, attached at apex, the style thick, ca. 1.5 mm. long, the stigma peltate. Fruit subglobose-subconical, ca. 1 cm. long, 2-celled, 2-seeded, the seeds ca. 5–6 mm. long.

Outstanding characters are the small, deeply etched heavy-coriaceous leaves, rounded and emarginate at the apex. For a species with leaves so small, the pedicels (2.5 cm.) are unusually long. Fortunately, I have before me the fragmentary isotype and photograph of Pavon's actual type of this species. The original description is useless.

According to Moricand, Pavon sent him a specimen of *T. quinquepartita*, to which the herbarium name "Ternstroemia pentapetala" was applied. Moricand described a new species, *T. Pavoniana*, based on this specimen. In his discussion, Moricand remarks that *T. Pavoniana* might be the same as Pavon's *T. quinquepartita* but that it is impossible to be certain from the simple description of Pavon. Furthermore, the name *T. pentapetala* appended to the specimen means exactly the opposite of *T. quinquepartita*, which, Moricand goes on to say, is a false epithet. He states further that the stamens, though a little more bunched in front of the middle of the petals seem to him to be arranged in continuous series rather than in five distinct phalanges as stated by Pavon.

Just when the specimen was sent by Pavon to Moricand is difficult to determine since 38 years elapsed between the publication of the two species. However, in 1898, Moricand was merely 19 years of age, so one might assume that it was sent surely after the publication of *T. quinquepartita*. It is further possible that Pavon, who died (1835) a year before Moricand's publication may have forgotten the existence of his *T. quinquepartita* and felt that in *T. pentapetala* he had a new species. This latter name, incidentally, was at that time invalidated because there already existed a *T. pentapetala* from Malaya described by Jack in Malay. Misc. I: pt. 5, 40. 1820.

At any rate, since these names are synonymous, the original binomial, *T. quinquepartita*, must be retained. Choisy (1855) follows the lead of Moricand and accepts Moricand's name, understanding the whole situation;

he did not like Pavon's name! Neither did Szyszyłowicz (1893) and Melchior (1925) evidently, since both have continued the name *T. Pavoniana*, the former under *Taonabo* and the latter under *Ternstroemia*.

46. ***Ternstroemia cuneifolia*** Gardner in Hooker, London Jour. Bot. **4**: 100. 1845. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 102 (Mém. Ternstr. 14). 1855. — Wawra in Martius, Fl. Bras. **12**¹: 276. 1886. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142, fig. 64. 1925.

Ternstroemia cuneifolia var. *glutinosa* Wawra in Martius, Fl. Bras. **12**¹: 276. 1886.

Mokofua cuneifolia (Gardner) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Taonabo cuneifolia (Gardner) Szyszyłowicz in Nat. Pflanzenfam. III. **6**: 189. 1893.

DISTRIBUTION: Brazil.

BRAZIL: Near Rio de Janeiro, Organ Mts., open places, alt. 1800 m., *G. Gardner* 5681 (ISOTYPE, NY; fragment, FM) (shrub 2–3 ft.; petals white). — Near Rio de Janeiro, *A. Glaziou* 8277 (photo of type of *T. cuneifolia* var. *glutinosa*, FM, G). — Precise locality lacking, *A. Glaziou* 14525 (G).

According to Wawra, the principal characters of this species are: Leaves coriaceous, cuneate-oblong, 3–6 cm. long, rounded or retuse at the apex, the margin obsolete revolute, distinctly serrulate at apex, the petiole 0.5 cm. long. Peduncles 1.0–1.5 cm. long, the bracteoles ovate, 2 mm. long, rounded at apex. Sepals 4–6 mm. long, orbicular, the outer lobes 4 mm. long, glandular-denticulate, the inner lobes 6 mm. long, entire. Petals orbicular, shorter than calyx-lobes, connivent. Stamens 25, bi-seriate, the filaments flattened, the anthers linear-sub-sagittate, five times longer than the filaments, very short-apiculate. Ovary 2–3-celled, cells 2-ovulate, the style very short, the stigma peltate, 2–3-lobed.

This species is so closely allied to *T. carnosa* that I am dubious of the specimens cited above and dubious even of its status as a species. Considerable variation may be found in the leaf and flower characters. The peltate stigma, the petals shorter than the sepals, and the very short-apiculate stamens seem to be the outstanding characters for separation. Unfortunately, I have not had complete material of either species for study.

47. ***Ternstroemia subserrata*** (Rusby) Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Taonabo subserrata Rusby in Bull. N. Y. Bot. Gard. **8**: 104. 1912.

DISTRIBUTION: Bolivia.

BOLIVIA: Cargadira, alt. 2500 m., *R. S. Williams* 1533 (TYPE, NY), July 30, 1902 (stout bush 7 ft. high).

Shrub with short, stout, gray-red, roughened branchlets. Leaves obovate, coriaceous, 4–7 cm. long, 2–3 cm. wide, obtusely acuminate at apex, tapering at base, the midrib canaliculate above, prominent below, the veins inconspicuous above, approximately 10 pairs elevated below with prominent reticulations, also dark-punctate below, the margin distinctly serrate, the petiole ca. 5–6 mm. long. Flowers solitary, abundant, the pedicel ca. 1 cm. long; bracteoles unequal, ovate-triangular, 1.0–1.5 mm. long and wide, glandular-denticulate; calyx-lobes suborbicular, ca. 4 mm. long, 4–5 mm. wide, outer lobes distinctly glandular-denticulate; petals obovate, very narrow at base, flaring toward apex, 6.5 mm. long, ca. 6 mm. wide, deeply emarginate at apex; stamens many, 130+, probably 4-seriate, the filaments variable in same flower, 1.0–2.5 mm. long, slender, joined at base, adnate to base of corolla, the anthers linear, ca. 1 mm. long, the connective slightly projected into a submuticous apex; ovary conical, ca. 2 mm. or less long,

ca. 2 mm. diam. at base, 2-celled, 3-ovulate, the style ca. 3 mm. long, the stigma sub-bi-peltate.

This species, like *T. asymmetrica*, is characterized by small floral parts. However, very outstanding are (1) the distinctly serrate leaves, conspicuously veined with obvious reticulations on the lower surface; (2) the many, 4-seriate stamens (130+) and (3) the very short petioles.

48. ***Ternstroemia Killipiana***, sp. nov.

Arbor 6–9 metralis, ramulis teretibus brunneis. Folia coriacea, oblongo-elliptica vel oblongo-obovata, 7–10 cm. longa et 2–3 mm. lata, aureo-viridia, undique opaca, apice acuminata, basi in petiolum attenuata, subtus sparse punctata, margine plana, integerrima vel apice leviter crenulata, costa supra canaliculata, subtus subtiliter elevata vel plana, nervis undique inconspicuis, petiolis 5–10 mm. longis. Flores solitarii, axillares, pedicellis brevibus 5–8 mm. longis, recurvatis; bracteolis 2 suboppositis ovato-triangularibus 2 mm. longis et 1.5–2.0 mm. latis, apiculatis, margine glanduloso-denticulatis; sepala 5, minuta, oblongo-aequilatera, fragilissima, 2–3 mm. longa et 1.5–2.0 mm. lata, apice subtruncata, basi leviter adnata, exterioribus glanduloso-denticulatis; petala minutissima, quam sepala breviora; stamina 2-seriata, ca. 60, inaequalia, 1.5–2.5 mm. longa, filamentis crassis vel gracilibus, 0.3–0.8 mm. longis, basi leviter connatis et ad basim corollae adnatis, antheris linearibus 1.2–1.5 mm. longis, connectivo apiculato vel mutico; ovarium conicum, breve, 1.5 mm. longum, basi 2 mm. diametro, 2-loculatum, loculis 2-ovulatis, stylo brevissimo, ca. 0.8 mm. longo, stigmate subcrenulato. Fructus ignotus.

DISTRIBUTION: Colombia.

COLOMBIA: Dept. Santander, Mesa de los Santos, in dense woods, alt. 1500 m., *E. P. Killip & A. C. Smith 15294* (TYPE, G; NY, US), Dec. 1926 (tree 25–30 ft.).

The very small flowers with short pedicels (5–8 mm. long), the minute calyx-lobes, not over 3 mm. long, and the equilateral truncate petals, even shorter than the calyx-lobes, are some of the more important distinguishing characters of this species. To these might be added the minute style which is less than 1 mm. long, and the tiny 2-celled ovary. The dull yellow-green, oblong-elliptic or near elliptic leaves, plane-margined and entire, are other distinctive characters.

This species is named for Mr. E. P. Killip, one of the collectors of the type specimen and an ardent student of the flora of Colombia.

49. ***Ternstroemia Mutisiana***, sp. nov.

Habitus ignotus. Rami ramulique grisei, verticillati. Folia coriacea, oblanceolata, 6.0–8.5 cm. longa et 1.5–2.5 cm. lata, apice longo-acuminata, basi longo-attenuata, margine plana, integerrima vel subcrenulata, costa supra leviter impressa, subtus subplana, venis invisibilibus, petiolis 5–10 mm. longis. Flores solitarii, pedicellis gracilibus 1.5–2.5 cm. longis; bracteolis 2 oppositis inaequalibus longo-triangularibus 2–3 mm. longis et 1.5–2.0 mm. latis, margine sparse glanduloso-denticulatis; sepala 5, imbricata, pergamentacea, ovata, inaequalia, 6–8 mm. longa et 4–5 mm. lata, exterioribus sparse glanduloso-denticulatis, interioribus margine scariosis; petala 5, ovata, 8–9 mm. longa et 4–6 mm. lata, basi connata; stamina circiter 40, uni-seriata, \pm 4 mm. longa, filamentis crassis quam 1 mm. minus longis, antheris linearibus circiter 3 mm. longis, connectivo obtuse

projecto; ovarium conicum, circiter 1.5 mm. longum, 2-loculatum, loculis 2-3-ovulatis, stylo breve crassoque circiter 1.5 mm. longo et 1 mm. crasso, stigmatē subcapitato.

DISTRIBUTION: Colombia.

COLOMBIA: Precise locality lacking, *J. C. Mutis* 2461 (TYPE, US), 3916 (US), 1760-1808.

Ternstroemia Mutisiana is characterized by the simplicity of its appearance. The leaves are oblanceolate, tapering long at both extremities, the margin plane and entire, the midrib lightly impressed above, plane below, the veins not visible. The ovary is 2-celled, conical and thick, measuring 1.5 mm. from the base, tapering into a stout style of approximately the same length and nearly $\frac{2}{3}$ as thick. The stigma is subcapitate.

This species is named in honor of the early Colombian naturalist, José Celestino Mutis.

LITTLE KNOWN OR DUBIOUS SPECIES

1. *Ternstroemia cuneata* Poeppig ex Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 109 (Mém. Ternstr. 21). 1855. Nomen nudum. = ?

This undescribed species is merely recorded by Choisy. He states that the genus is unknown to him.

2. *Ternstroemia rubicunda* Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. Nomen nudum.

3. *Ternstroemia Ruiziana* Moricand in Mém. Soc. Phys. Genève, **7**: 257, t. 12. 1836. — Walpers, Repert. Bot. Syst. **1**: 368. 1842. — Choisy in Mém. Soc. Phys. Genève, **14**: 106 (Mém. Ternstr. 18). 1855. — Melchior in Nat. Pflanzenfam. ed. 2, **21**: 142. 1925.

Mokofua Ruiziana (Moricand) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

Moricand states that this species has angled branches, four bracteoles, a tubular corolla and a velutinous ovary. The leaves are distinctly dentate, sessile, and the veins are conspicuously raised on both surfaces.

There is no doubt in my mind that this species does not belong in the genus *Ternstroemia*. The tubular corolla (mentioned in the description and clearly illustrated) and the velutinous ovary immediately ban it from the genus. Four bracteoles, although unusual, are found in a single species, *T. heptasepala* Krug & Urban, in the West Indies.

A single leaf, taken from the type, was the only material available for my study. Although such a condition is not impossible, I have never seen a sessile-leaved specimen of *Ternstroemia* or one with leaves so conspicuously veined on both surfaces. In the illustration the anther appears much shorter than the filament, a feature not typical in *Ternstroemia*.

The description and illustration, while in a way revealing, are too poor to suggest generic classification.

4. *Ternstroemia roraimae* Klotzsch in Schomburgk, Fauna Fl. Brit.-Guiana, 1092. 1848. Nomen nudum.

5. *Ternstroemia venosa* Sprengel, Neue Entdeck. **2**: 162. 1821; Syst. Veg. **2**: 595. 1825. — De Candolle in Mém. Soc. Phys. Hist. Nat. Genève, **1**: 411 (Mém. Ternstr. 19). 1822. — Choisy in Mém. Soc. Phys. Hist. Nat. Genève, **14**: 108 (Mém. Ternstr. 20). 1855. — Wawra in Martius, Fl. Bras. **12**¹: 281. 1886.

Mokofua venosa (Sprengel) O. Kuntze, Rev. Gen. Pl. **1**: 63. 1891.

The outstanding characters of this little-known species are: 1. Dentate, lanceolate leaves (narrower than *T. dentata*), opaque and obscurely veined above, prominently veined below. 2. Flowers axillary, the peduncles *aggregate*, very short. 3. Calyx-lobes and bracteoles glandular-denticulate. 4. Corolla twice as long as the calyx. 5. Fruit two-celled, eight-seeded.

It is odd that a species so well described should be so little-known. Choisy (1855) and Wawra (1886) both treat it as dubious, the latter suggesting a close relationship with *T. dentata*. The type was collected by *Otto* in Brazil. Later Sprengel (1825) cites a second specimen collected by *Sello*, also from Brazil.

EXCLUDED SPECIES

Ternstroemia Steubelii Hieronymus in Bot. Jahrb. **21**: 320. 1896 = **Patascويا Steubelii** Urban in Bericht. Deutsch. Bot. Gesell. **14**: 282. 1896.

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